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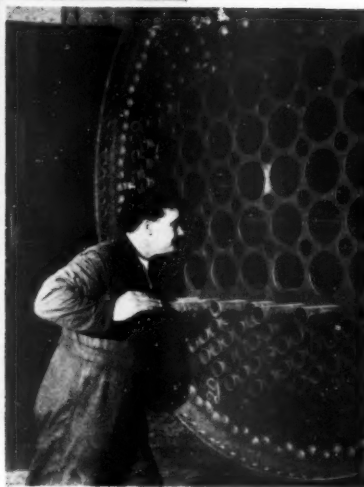
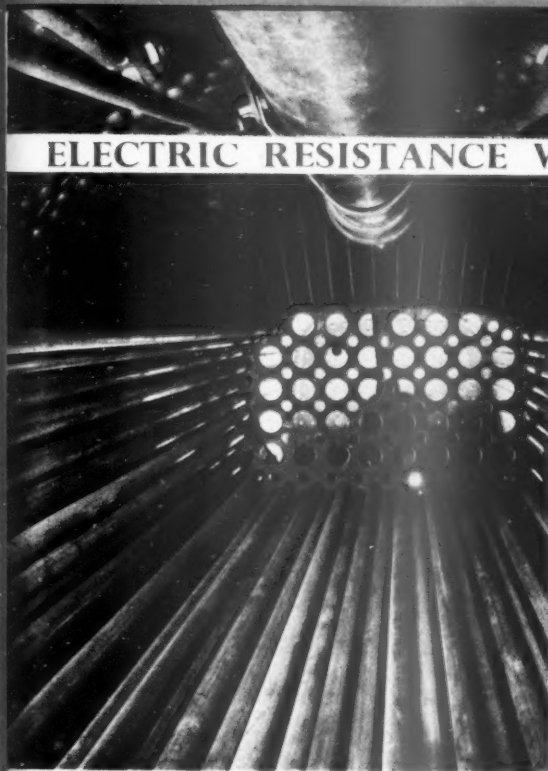
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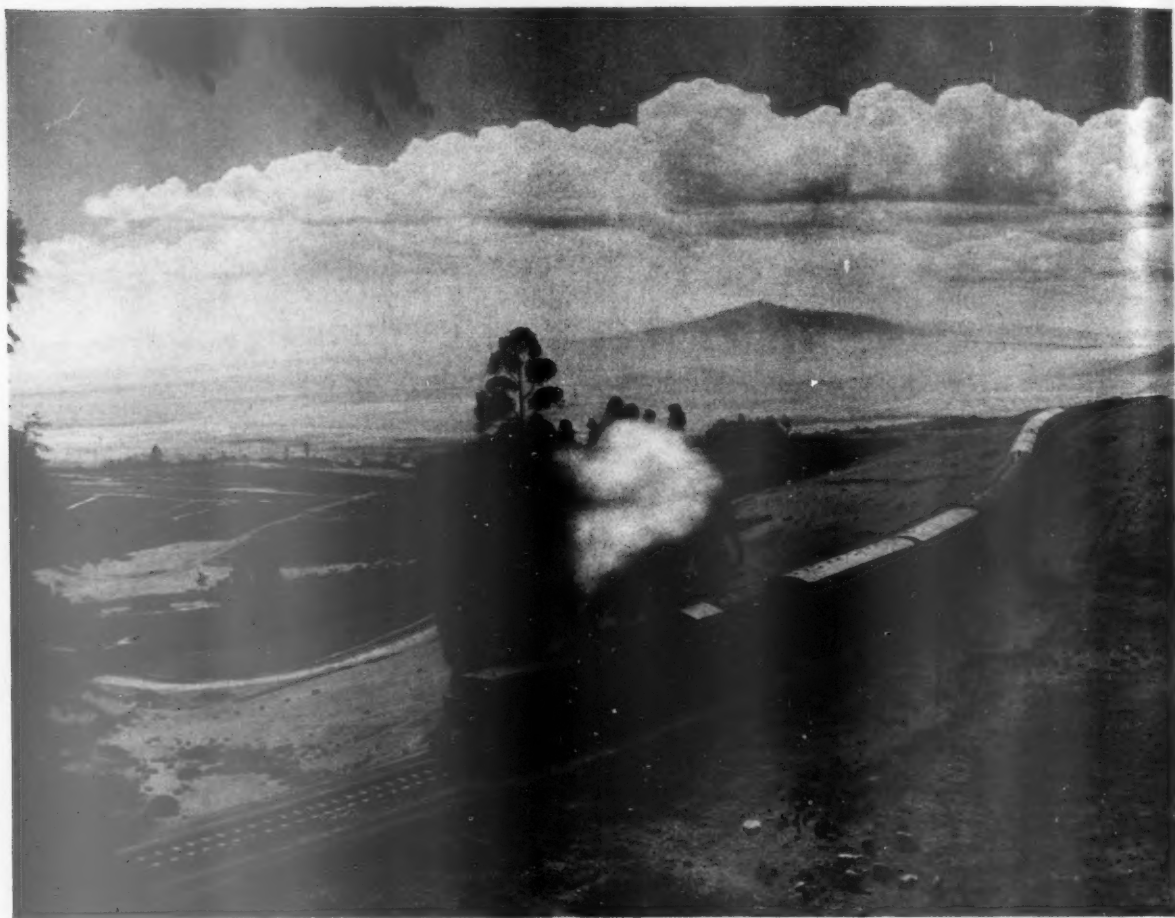
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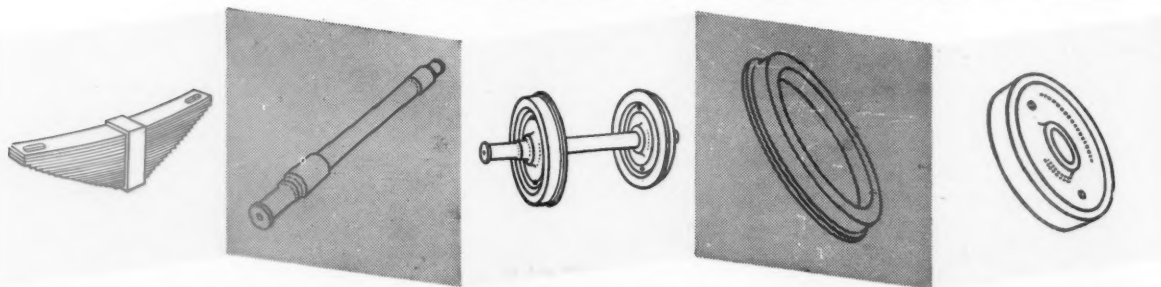
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Towards Stability in Wages

THE reports of the courts of inquiry into the shipyard and engineering pay disputes, published last week, are unusual in that they recommend alternative increases in pay, of 5 per cent without conditions or of 6½ per cent if the trade unions accept conditions laid down by employers during the recent strikes. Both courts had the same membership. The conditions refer to a "standstill" period of 12 months on wage demands, co-operation in ending certain restrictive practices, and preventing losses of working time. The trade unions must now declare their interest in stability and higher productivity if their members are to receive the greater increase in pay. If the conditions are accepted, and the support of the Amalgamated Engineering Union makes that seem probable, these industries will have a much-needed period of stability in which to concentrate on higher production. The Confederation of Shipbuilding & Engineering Unions was about to meet at York, as we went to press, to consider the courts' recommendations, and its views will be put to the engineering employers on May 16, the day after the management board of the Engineering & Allied Employers' National Federation has considered the reactions of its local associations

to the findings of the courts. The shipbuilding employers will meet the unions on May 20. The courts' observation that a claim for at least 5 per cent was difficult to resist because of recent increases of that amount in some industries which were "either not profitable or only barely profitable," is bound to be read with reference to the British Transport Commission and will doubtless cause fresh accusations of inflationary policies to be levelled at it. It is perhaps unfortunate that railway pay claims are among the first in the annual cycle. The Commission has made a bid to secure some stability in wages by agreement with the trade unions and, if it succeeds, it may well escape from its present position of scapegoat. The recommendation of the courts of inquiry that a national joint council should be set up in both the engineering and shipbuilding industries to carry out periodic wage reviews is in line with the Commission policy for the railways, so that the Commission may claim to have given a lead in this respect to industry in general. The third main recommendation of the courts, that an authoritative and impartial body should be set up by the Government to "examine and advise on the wider problems of wage policy in an inflationary setting," already welcomed by the Government, is a step towards a national wages policy which may have important long-term effects.

Salary Increases for Railway Officers

THE flat increase of 5 per cent for officers of British Transport Commission headquarters and of British Railways in receipt of salaries in the range of £965 to £2,125, agreed earlier this week between the Commission and the British Transport Officers' Guild, is especially welcome for several reasons. The Commission freely granted the increase; and the latter is equal in amount to that granted to the rank-and-file of railwaymen who are members of the three railway unions—the first time that a flat percentage increase has been awarded to officers, as opposed to the previous, grudging agreement by the Commission of varying, small amounts, in which the higher-paid officers concerned received proportionately very little. The new agreement covers all above Special Grade clerks and up to and including the upper limit of salary on which the Guild has been negotiating. Just as the increase is consequential on that granted to union members, one may hope for a like increase for officers in receipt of more than £2,125 a year. At last there seems to be recognition that, as we have pointed out on several occasions, rises in the cost of living affect officers as well as the rank-and-file of railwaymen.

Problems of Management

THE need for everyone concerned with industry to regard it as part of his duties to absorb new knowledge and exploit new technical situations was stressed by Mr. H. P. Barker, Chairman, Parkinson & Cowan Limited, and a part-time Member of the British Transport Commission, in his opening address to the Sixth Scottish Conference of the British Institute of Management, held at Gleneagles last weekend. Great firms and great industries, he pointed out, can be placed in danger of extinction if their eyes are not open wide enough. In these days, assets are obsolete long before they are worn out and financial management must bear this in mind. The day has gone, Mr. Barker insists, when massive industrial investment can be safely laid out on the "never-never" system of depreciation which has "done more than any one thing to eviscerate and weaken many of our great industries"—among which he includes the railways. Regarding human personality as the driving power of industry, he considers the growing speed of travel and the use of speech recording devices to be "a primary evolution." He emphasises the human side of industry also in urging managements to create working environments in which people will want to participate. Useful as monetary incentives are, many will agree with Mr. Barker when he states that non-monetary incentives, such as granting of status or award of prestige, may equally be appreciated by members of staffs.

A Feat of Locomotive Building

A REMARKABLE and encouraging achievement in quick delivery of locomotives—but in accordance with the firm's record in these matters—was performed last year by Beyer, Peacock & Co. Ltd. Mr. Harold Wilmot, Chairman & Managing Director of the company, has related in his annual review, mentioned briefly last week, how in December, 1955, his firm secured an important locomotive order from the South African Railways administration for 35 Beyer-Garratt locomotives. An essential condition of the contract was a delivery commencing in seven months—on the face of it an impossible task. Only by straining to the utmost their friendly relationship with suppliers and by the adoption of unconventional methods in the manufacture of certain essential components could the builders deliver in accordance with their obligations. The first locomotive was in fact in steam and under test at the Beyer, Peacock Gorton Works one month before contract date. This, Mr. Wilmot points out, is a small example—we feel “small” to be an understatement—of what can be done when men of goodwill co-operate to achieve the apparently impossible.

Importance of Early and Punctual Deliveries

IN view of the criticism, not always unjustified in the past, of late deliveries by British exporters of railway material, it is important to bear in mind not only this recent achievement of Beyer, Peacock & Co. Ltd., but the firm's delivery record, which has been almost free from blemish. Because of the many difficulties with which the locomotive industry has been beset since the war, including shortages of materials, this in itself points to a high standard of efficiency. The quotation of reasonably early delivery dates, and the assurance in the mind of the customer that these will be adhered to, is a major factor in securing the placing of orders—perhaps a determining factor when competitive tenders are within a small price range. This has been stressed recently by more than one administrator of an overseas railway system which has been considering the placing of locomotive and rolling stock orders in other countries—but whilst fully recognising the excellence of British workmanship. The importance also of maintaining and strengthening the goodwill of existing customers was recognised by Beyer, Peacock in making an effort, which though costly in direct profit, was rightly considered very well worth while.

Overseas Railway Traffics

RAILWAY operating revenues of the International Railways of Central America for March amounted to \$1,576,845, an increase of \$98,463 compared with March, 1956. The aggregate net revenue from railway operations for the period January 1-March 31 was \$1,071,275 (\$1,145,989). Costa Rica Railway receipts for March were colones 1,947,198 compared with colones 1,770,450 for March, 1956, an increase of colones 176,748. The aggregate receipts for the nine months July-March were colones 14,511,627 (15,396,141). Midland Railway of Western Australia estimated railway and road service receipts for February were £A69,121 against £A58,374 for February, 1956, an increase of £A10,747. The aggregate for the eight months July-February was £A614,549 compared with £A560,063 for the corresponding period of 1955-56. Paraguay Central Railway receipts for the week ended April 5 were G2,194,092, an increase of G627,489 over the preceding week. This level was not, however, maintained in the following weeks, and the receipts for the week ended April 19 were G1,569,583, a decrease of G110,052 on the corresponding week of 1956.

Training in Technical Authorship

RECOGNITION of the growing demand for technical authors, and of the shortage of men and women competent in this important field is being made by the City & Guilds of London Institute. The April issue of

the *City & Guilds Broadsheet* records that the Institute is setting up a committee to explore the problem of the training and qualification of technical authors, and, if thought desirable and practical, to draft a scheme of syllabuses and examinations. The *Broadsheet* points out that, unlike the technical artist—to provide for whose specialised education regulations and syllabuses already have been published—the technical author must be a qualified engineer, besides being able to write clearly and concisely, and to edit publications and arrange for their production. The industrial and technological developments now taking place with ever-increasing frequency add greatly to the importance, in promoting the techniques and sciences concerned, of clear and accurate writing on technical subjects. The Institute is to be congratulated on the step it is taking; but its committee has a complex and arduous task.

Diesel Trains for the Hastings Line

BECAUSE of the necessary delay before the forthcoming third-rail electrification of the Kent Coast and the Dover and Folkestone main-lines of the Southern Region can take effect, and as the Hastings services via Tunbridge Wells were deemed of high priority, the Region is introducing six-car diesel-electric trains as the quickest means of solving the problem of extra passenger capacity on this line; the result is great improvements in speed and frequency of service. The stock, described elsewhere in this issue, combines construction which has become standard for electric multiple-unit coaches for the Region, with a form of power transmission layout new to British Railways. Because of loading gauge restrictions in some tunnels, the stock has been constructed nearly 1 ft. narrower than the standard 9-ft. wide rolling stock under construction for the electrification scheme; the interior layout design staff have achieved what seems to be the maximum possible seating width in the circumstances, though comfort in the second class leaves something to be desired. As mentioned last week, in view of the need to make fullest use of the traffic facilities now available at Cannon Street, four of the sets have been introduced between that station and Hastings, six weeks before the planned original date.

Economies in Sanding

THE management of the Southern Pacific Lines in U.S.A. estimates that permanent way damage resulting from an excessive use of sand with its diesel locomotives amounts to \$500,000 annually and the annual overall cost of supplying sand for locomotives is about \$450,000. It might seem that any economies which could be obtained from efficient diesel locomotive sanding would be hardly worth while, and not important enough to warrant setting up a committee to conduct experiments with the object of obtaining more efficient sanding, and at the same time assess potential savings. From a report received, details of which are given elsewhere, it is considered that, allowing for a 50 per cent utilisation, $\frac{1}{2}$ lb. of sand per min. on each wheel at 14 m.p.h. is the minimum. Investigations showed that from 3 to 5 lb. of sand was being delivered at the wheels by sanding; so that potential savings amount to seven-eighths, taking the mean sand consumption at 4 lb. The annual saving to the Southern Pacific Lines is approximately \$390,000, apart from economy resulting from less damage to the permanent way.

Meeting British Railways' Fuel Demands

BECAUSE of the demand for petrol and the fixed ratio of diesel fuel and other products, including petrol, which can be produced at an oil refinery, the oil industry in this country welcomes the conversion of the railways to diesel traction, and is confident of being able to meet British Railways' greatest fuel requirements of however complete the conversion programme. This view was expressed during an official tour by a party of some 120

Members of the Institution of Locomotive Engineers, of the Fawley Refinery of the Esso Petroleum Co. Ltd. on May 3. The refinery is the largest oil refinery in the British Commonwealth, with a yearly output of 8,000,000 tons. Although a new plant covering 450 acres was brought into operation in 1951, expansion is still continuing and the total land owned by the company is some 1,000 acres. It is interesting to note the extensive use still made of coastal shipping for distribution, approximately 95 per cent of the refinery's products being despatched by water via the marine terminal.

Management of Nationalised Industries

PERTINENT and sound observations on appointments to the boards of nationalised industries were made during the Second Reading of the Electricity Bill in the House of Lords last week, notably by Lord Simon of Wythenshawe, who has himself served as Chairman of the British Broadcasting Corporation. He seems to have had the principal boards, such as the National Coal Board and the two central boards—the Central Electricity Generating Board and the Electricity Council—proposed for the electricity supply industry in mind, rather than Area Boards, though these, too, were mentioned in the debate. Much of what was said can be applied in principle to the British Transport Commission, which was, in fact, referred to by name by Lord Lucas of Chilworth.

Lord Simon concerned himself mainly with methods of securing the best possible boards for nationalised industries, and drew attention to the "remarkable contrast" between the way in which members of boards are selected in nationalised and private industries. In some of the largest private undertakings, selected new entrants from the schools and universities are trained for many years, and as Lord Simon emphasised, not only as specialists but also in top management. Directors of such companies, he points out, are usually appointed at about the age of 50, and there is, therefore, at any one time a considerable number of well-trained men worthy of consideration for vacancies on the board. It is then the practice for the whole board, including the chairman and deputy-chairman, to agree on the most suitable candidate. In the case of two very large private undertakings, Unilever and Imperial Chemical Industries, Lord Simon was able to tell the House that he had been assured that the choice was made unanimously. Once appointed, a director remains on the board, barring unusual circumstances, until his retirement. Thus the directors have a long career in the company, after leaving school or graduating, until retirement.

The situation as to nationalised industries is very different. The appointment is made by a Minister who cannot possibly have the personal knowledge of likely candidates that is common in private industry. Furthermore, although the chairman of a nationalised industry may be consulted by a Minister, it seems unlikely that a Minister has ever consulted the board of a nationalised industry as a whole. As Lord Simon admits, the nationalised industries have hardly had time to institute training schemes which are designed to lead to the board itself, but there are many railwaymen, for example, who have had training which fits them for management at very high levels, and the British Transport Commission includes more than one Member who has had a distinguished railway career. Whether the number of Members experienced in transport matters will be increased in the course of time is a matter for the Minister, but there are obvious advantages in holding a judicious balance between Members with knowledge of their own branch of transport and others with an equally wide knowledge of matters such as administration and accountancy, which are common to many industries, apart from general experience in the field of industry or commerce.

It is this second class of Member which the British Transport Commission, in common with other nationalised industries, may find it increasingly hard to attract. The fact that their knowledge is of such wide application causes

such men to be sought by all types of industry, and, as we have pointed out on many occasions, the salaries offered by the nationalised transport industry are not sufficient to attract the right men in the future. Lord Simon, with reference to the Coal Board, stated in the debate: "Salaries and, I think, pensions are notoriously inadequate . . . the ordinary Board members may get £5,000; and it seems to be the tradition that anybody not on the Board is never paid more than a Board member." This is a factor of great importance, which applies also in principle to the British Transport Commission, and tends not only to deter prospective board members, but also to cause men of ability with technical qualifications to look elsewhere than the railways or the other nationalised industries when choosing a career. In many private companies, as in the two already mentioned, the path to board membership is clear for those able to take it. This cannot yet be said to be true for British Railways, where also, to quote Lord Lucas of Chilworth, "in the higher-bracket management groups salaries are paid that would be disgraceful in the case of a door-to-door salesman." Lord Lucas also claimed that "not one single entrant" is going from the public schools or the universities into nationalised transport, but whether this be true at the moment or not—and certainly there are many university graduates and products of public schools already in the service of the British Transport Commission—British Railways are making every attempt to attract such entrants, as we pointed out in our April 19 issue.

Lord Simon also drew attention, rightly, to the limited terms of office of members of the boards of nationalised industries. He himself served the B.B.C. for five years, and then had to make way for another chairman for no reason other than that it was "somebody else's turn." The appointments of Members of the British Transport Commission have not been terminated on the same scale as has applied to some of the other boards—the average "life" of a National Coal Board member in the last 10 years has been only 3½ years—but there must inevitably be a feeling of uncertainty as the term of appointment draws towards its end, which is detrimental to long-term planning, to say nothing of the peace of mind of the Member concerned. To some extent, also, the fact that a Minister can appoint new Members at intervals is open to political abuse. Possibly appointment, not for a term of years, but until a Member reaches a certain age would meet this problem, but a better solution would be to make the appointment of Members dependent on wider recommendation. The Minister, in effect, so far as the voting on appointments of Board members is concerned, represents all the shareholders in a nationalised industry, but in industry in general, even though shareholders confirm appointments to the board by their votes, it is rare for nominations to be made other than by the existing board.

Rail Transport in Europe

THE contrasting pattern of freight transport in Western and Eastern Europe is revealed by statistics published in the "Economic Survey of Europe in 1956" published recently by the United Nations in Geneva and prepared by the Research & Planning Division of the Economic Commission for Europe. The rate of growth of goods transport in general is reported to have been greatest in the U.S.S.R., where the volume grew sixfold between 1930 and 1954, reaching a total almost twice as great as in the rest of Europe combined. In the United Kingdom, France, and Western Germany, the increase was some two-thirds of the 1930 volume. In Russia and elsewhere in Eastern Europe, 90 per cent of the large increase was carried by the railways, but in Western Europe only one-third of the increase was carried by rail. The growth in passenger transport follows a similar pattern, with rail services carrying the major proportion of passengers in the east, and motorcars and buses carrying many more passengers than the railways in the west.

In highly-industrialised Western Europe, and in some of the Southern European countries, tonnage loaded on

rail was less in 1950 than in 1930, a fact attributed to the small increase in the output of coal and ores—the basic railway traffics—and the loss of short-haul consignments to the roads. The average rail haul, however, has become much greater, and as a result the ton-mileage worked has actually increased in some countries and has fallen, proportionately, much less than tonnage loaded in other countries. In all the countries of the European Coal & Steel Community, railway transport reached, both in tonnage loaded and ton-miles, a much higher level in 1954 than in 1950. This was caused, in part, by the general increase in steel output and also by the opening of a common market in coal, steel, and allied raw materials in 1953. Incidentally, inland water transport was affected to a still greater extent.

Railway investment is higher, as a share of the national product, in the U.S.S.R. and Eastern Europe, and also in Yugoslavia, than in most other European countries. In the U.S.S.R. and Yugoslavia some 60 per cent of the total investment in transport and communications in the last few years has been in railways, representing in the case of Yugoslavia more than 3 per cent of the gross national product. The percentage of the gross national product invested in railways in the United Kingdom from 1950 to 1952 was 0.28 per cent, with an increase to 0.35 per cent in 1953-55. The 1950-52 figure was the lowest in Europe and the 1953-55 figure was almost the lowest, but the rate is likely to be at least doubled with expenditure on the modernisation plan and will then be comparable with that of, say, Western Germany, though still well below that of France. The effect of war damage, and its subsequent repair, on European railways must be borne in mind in considering these figures. The closing of railways also is proceeding in the countries of Western Europe, and between 1930 and 1954 some 6 per cent of the railway network was closed in both the United Kingdom and France. In some countries closures were made even faster, reaching 10 per cent in the Netherlands, Denmark, Ireland, and Luxembourg. In 1954, 24 per cent of the railways of France had been closed to passenger traffic, and in the Netherlands 22 per cent had been closed. The closing of 13 per cent of lines to passengers by Belgium and the United Kingdom is relatively modest, particularly when it is considered that in the Netherlands two-thirds of all stations are closed to passenger traffic.

The geographical complexity of British Railways, with their short hauls, many branches and marshalling yards, and such factors as the design of British passenger stations, which demand a relatively large maintenance staff for waiting rooms, and so on, is emphasised by a table showing employees per unit of traffic, which is headed by the Netherlands with a figure of 0.5. France and Western Germany both show a figure of 0.9, and the United Kingdom shows up very badly with 1.4 employees per unit of traffic, a figure exceeded only by Norway, Spain, and Greece, with their sparse traffics, and, possibly in Spain, a certain amount of "hidden" unemployment, with 1.7, and Portugal, where hauls are short, with 2. The corresponding figure for the U.S.A., where, however, conditions are very different, is 0.2. In the United Kingdom, utilisation of railway rolling stock is by far the lowest in Europe, and the "Economic Survey of Europe" states that even when modernisation is completed, efficiency of utilisation may remain lower than it is at the present time in many other European countries. One factor affecting the use of wagons—largely outside the control of the railways—is the turnaround time, which averages 12 days in the United Kingdom against 5.5 in Western Germany and 6.7 in the U.S.S.R. Only one country, Italy, has a longer turnaround period. A wagon in Western Germany carries four times as much in a year as its counterpart in the United Kingdom, and a French wagon, with a turnaround time only slightly less than on British Railways, carries 2½ times as much. For this undue leniency to railway users in loading and unloading is probably mainly responsible.

As to revenue, only Sweden, Switzerland, and the Benelux countries have a comfortable margin of railway revenue over operating costs, no doubt helped by the transit

traffic through all the countries concerned except Sweden. In the U.S.S.R. railway costs are low and the average revenue per ton-mile is lower than in any other European country. Costs are reduced by the long hauls, the larger loading-gauge and the very high degree of utilisation of track and equipment. Passenger fares are high in relation to goods charges, suggesting that passenger traffic is made to cover its overhead costs to a greater extent than in Western European countries. Looking ahead, the "Survey" suggests that the number of new passengers attracted to railways for the next few decades may counter-balance the losses to road on short and medium journeys, and possibly to air on long journeys. There is likely to be a fall in freight traffic as other energy sources take the place of coal. In all the countries considered there is no suggestion that railways are anything but vitally important to the national economy. Indeed, there is no European country in which the pace of railway improvement and re-equipment is not as great—except perhaps for postwar rehabilitation in one or two cases—as at any time since the early days of construction and expansion.

British Transport Commission Traffic Receipts

COMPARISON between Period 4, the four weeks ended April 21, 1957, and the corresponding period of last year, is vitiated by the incidence of Easter; in 1956, the whole of the Easter weekend fell within the period, whereas this year only part of the holiday was included in those four weeks. Aggregate passenger receipts of British Railways for the 16 weeks of the current year to April 21 are some 18 per cent in excess of the 1956 figure; for this fuel oil restrictions, and, perhaps, to a lesser extent, exceptionally mild spring weather favouring excursions, seem to have been responsible.

	Four weeks to April 21		Incr. or decr.	Aggregate for 16 weeks		Incr. or decr.
	1957	1956		1957	1956	
	£000	£000	£000	£000	£000	£000
Passengers—						
British Railways ..	10,819	9,624	+ 1,195	38,119	32,311	+ 5,808
London Transport:						
Railways ..	1,743	1,633	+ 110	7,290	6,650	+ 640
Road Services ..	4,606	4,213	+ 393	18,510	16,417	+ 2,093
Provincial & Scottish buses ..	4,356	4,145	+ 211	17,175	15,024	+ 2,151
Ships ..	366	391	- 25	974	996	- 22
Total Passengers ..	21,890	20,006	+ 1,884	82,068	71,398	+ 10,670
Freight, Parcels and Mails—						
British Railways:						
Merchandise & live-stock ..	8,160	7,821	+ 339	36,285	32,179	+ 4,106
Minerals ..	4,107	3,988	+ 29	17,202	16,094	+ 1,108
Coal & coke ..	9,365	9,249	+ 116	41,845	39,449	+ 2,396
Parcels, etc., by passenger train ..	3,828	3,508	+ 320	15,087	13,646	+ 1,441
Collection & delivery, etc. ..	1,061	960	+ 101	4,312	3,841	+ 471
Total freight, British Railways ..	26,431	25,526	+ 905	114,731	105,209	+ 9,522
Others* ..	4,189	4,223	- 34	16,651	16,973	- 322
Total freight, parcels and mails ..	30,620	29,749	+ 871	131,382	122,182	+ 9,200
Total ..	52,510	49,755	+ 2,755	213,450	193,580	+ 19,870

* Inland waterways freight, road haulage, and ships

London Transport traffic receipts during Period 4 exceeded last year's figure by 8.6 per cent—6.7 in the case of railways and 9.3 per cent in that of road services. The greater part of this increase appears to be accounted for by the addition, last autumn, of the halfpenny to Underground and bus fares; this is borne out by the increase in the aggregate for the 16 weeks since January 1, which totals 10.2 per cent for London Transport, of which 12.7 is in respect of bus and 9.6 per cent in that of Underground traffic; the reason for the greater improvement in respect of the longer period would again be the incidence of the Easter holiday, which favours the 1956 figure.

With freight traffic, again, only the aggregate receipts for the 16 weeks offer any possibility of comparison with last year. For British Railways freight merchandise traffic the figure is 12·7 per cent up, very largely, no doubt, because of fuel oil restrictions. For coal class traffic there is an increase of 6 per cent, and one of 6·8 per cent for mineral traffic.

PERCENTAGE VARIATION 1957 COMPARED WITH 1956

	Four weeks to April 21	Sixteen weeks to April 21
<i>British Railways—</i>		
Passengers	+12·4	+17·9
Parcels	+9·1	+10·5
Merchandise & livestock	+4·3	+12·7
Minerals	+0·7	+6·8
Coal & coke	+1·2	+6·0
C. & D. services	+10·5	+12·2
Total	+5·9	+11·1
<i>Ships (passengers)</i>	<i>—6·3</i>	<i>—2·2</i>
<i>British Road Services, Inland Waterways and Ships (cargo)</i>	<i>—0·8</i>	<i>—1·8</i>
<i>Road Passenger Transport, Provincial & Scottish</i>	<i>+5·0</i>	<i>+14·3</i>
<i>London Transport—</i>		
Railways	+6·7	+9·6
Road services	+9·3	+12·7
Total	+8·6	+11·8
Aggregate	+5·5	+10·2

Protection of Rolling Stock

VARIOUS factors contribute to the intensive use of rolling stock, not the least of which is protection from corrosion, by the use of paints adequate for the purpose irrespective of first costs. In his paper on the cleaning and painting of rolling stock, delivered before the Institution of Locomotive Engineers on April 24, Mr. F. Fancutt, Assistant Director, Chemical Services, Research Department, British Transport Commission, referred to the conditions of service of rolling stock, which, he points out, are particularly severe, and the task of maintaining the high standard set is not easy. The most difficult condition to be met is the fact that railway passenger vehicles are not parked under cover, and with few exceptions are fully exposed to the weather; also a large proportion of passenger stock is used only during the holiday season, and is parked in open sidings throughout the remainder of the year.

In nearly all such cases, vehicles deteriorate at a greater rate than those in use, though with railways serving industrial areas atmospheric pollution is at its worst, and corrosion rates highest. More recent developments have resulted in the production of a cleaning agent which, if not actually an anti-corrosive agent—and there is some evidence of this, is certainly not an aggressive promoter of corrosion. The painting and protection of locomotives is somewhat less difficult than is the case with carriages, and the problem in the main is one of accommodating output requirements, and keeping the locomotive in service for the maximum time. The painting of wagons creates the greatest economic problems, if only because of the great number of units involved. So far as the steel wagon is concerned a major difficulty is the proper pre-treatment of the steel surface, and until this has been solved no improvement in performance of the protective systems could be expected. Meanwhile the objective has been to meet production requirements with improved methods of application and quicker drying paints, but he pointed out, helpful as these may be, it hardly touched the problem of reducing corrosion and maintenance painting treatment.

In citing examples, Mr. Fancutt stated that the most recent maroon colour adopted for British Railways locomotive hauled stock was based on alizarine madder lakes, and the paint containing it so formulated, that without serious loss of depth of colour, it required the use of only one coat of primer, a saving in the number of coats previously employed. The new green colour used on British Railways multiple-unit stock is both acid and alkali

resistant, and also fast to light, a result achieved by the combination of a very stable yellow pigment dyestuff and the British discovery, Monastral Blue, a phthalocyanine blue pigment. Important as the pigment is in contributing colour, opacity, and other physical properties of a paint film, these properties can only be superimposed, as it were, on the film forming constituents of paints. Linseed oil, he points out, has been the principal component of the media, and so it remains today.

The character of the oil as used in modern paints has been fundamentally modified by the introduction of synthetic resins, and it is a constituent of such resins that linseed oil finds its greatest use at present in the exterior painting of rolling stock, as a constituent of alkyd resins. Of other oils which have been, or are being used, tung oil is the most important, and where speed of drying, durability, and water resistance are important, it is a common constituent. The choice of the alkyd medium for finishing paints when British Railways standard painting systems were introduced, has, he considers, been fully justified. Repainting is now rarely required by reason of the breakdown of the paint film itself, and the intrinsic durability of the alkyd resin enamels and varnish employed, is at least twice that of the resinous finishes previously employed.

Mr. Fancutt goes on to describe what was being done on British Railways. The sequence of operations in the painting of British Railways rolling stock is governed by Codes of Practice which are prepared by Chemical Services of the Research Department, and approved by the Mechanical Engineering Committee. The Codes are regarded as essential to the satisfactory maintenance of a high standard of performance, and among factors borne in mind are that durability and protection from corrosion must be achieved at minimum cost. Referring to the steam locomotive, Mr. Fancutt rightly observes that the dragbox is specially vulnerable, the degree of corrosion which occurs is serious, frequent renewals are necessary, and investigations are being conducted to devise a more positive method to prevent corrosion. Co-operation with the paint industry has been fostered to take advantage of increasing technological developments. The years 1957-1965, he believes, may be the most profitable period, insofar as results are concerned.

In recent years the International Union of Railways (U.I.C.), through the Office for Research & Experiments at Utrecht, has set up committees to study and advise on common interests, three of such committees under the chairmanship of Mr. Fancutt, have been set up to study problems arising in the painting of railway permanent structures, and rolling stock. Corrosion, it is considered, is a serious problem; with rolling stock this aspect affects considerably the time spent under repairs, and consequently intensive use, and the amount of stock required. Railway engineers should therefore take the fullest advantage of modern developments in paint technology both in this country and overseas. No doubt the spray painting of vehicles, which appears to be increasingly used overseas, will also be developed in increasing quantity as a means of saving both labour and costs.

LONDON MIDLAND REGION WEEKLY EXCURSION TRAINS.—Among several innovations introduced by British Railways, London Midland Region, in recent years to attract new holiday business, is one where a special train runs to a different resort each day during a town holiday week. The London Midland Region have successfully introduced such trains from Birmingham, Coventry, Northampton, Wolverhampton, Luton, Derby, Nottingham, Mansfield and Leicester, and these are to be run again this year. A special non-stop cafeteria express, with a guaranteed seat, runs to a different resort on five days of the week. The trains leave after breakfast and return in the evening. Inclusive fares for the week range from 50s. An example of the 50s. holiday express is one from Leicester during the City's holiday weeks. It goes to North Wales on Monday, Southend on Tuesday, Skegness on Wednesday, London on Thursday, and Blackpool on Friday.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Wagon-Miles per Wagon-Day

April 27

SIR,—I note in the editorial article entitled "World Bank Railway Mission in India" in your March 1 issue, that the Indian Railways claim that the figure of wagon-miles per wagon-day is now higher in India than in any other country, being 48.9 for all serviceable wagons in 1955-56, compared to the U.S.A. figure of 48.1 and that of the Canadian National Railways, 46.7 in 1954-55.

Whereas it is fully realised that methods of calculating wagon-miles per wagon-day figures may vary in different railway administrations, it may be of interest to your readers to know that the average miles per wagon per day figure reached by the East African Railways in 1953 was 61.6. This figure has since fallen to 58.3 in 1954, 55.9 in 1955, and 50.7 in 1956 as a result of the influx of new rolling stock that has given a measure of spare capacity at certain times of the year. It will be seen that even our lowest figure over the last four years is higher than that now claimed by the Indian railways as being the highest in any country.

For the purposes of our statistics all main-line goods vehicles (excluding service vehicles and wagons on engineering trains, and so on) are reduced to four-wheel "units" (bogie wagon = two units). Deductions are made for vehicles out of traffic for repairs and the total divided into the total "unit mile" figure which is obtained from guards' train reports.

Yours faithfully,

MALCOLM H. ARCHER
Public Relations Officer

East African Railways & Harbours,
Nairobi

The Fuel Oil Tax

May 3

SIR,—On behalf of our respective Associations we wish to make the strongest possible protest against Mr. J. H. Brebner's letter, "The Fuel Oil Tax," published in your issue of April 19.

Mr. Brebner begins with a hoary fallacy. He states that whereas the railways have to pay for their own track, "road transport, in compensation for special taxation, enjoys the free use of 190,000 miles of road" (the italics are ours). What are the facts? In 1956 the total amount spent on the roads was £110 million. The amount paid by the bus and road haulage industries in taxation (licences and fuel tax) was nearly £200 million. Free, indeed!

Mr. Brebner's next point, however, is more serious. For many years all sections of road transport have been publicly inveighing against the penal duty charged on derv, and it will no doubt come as a surprise to many to find the largest single user of derv, the British Transport Commission, not only complacent about the present rate of 2s. 6d. a gallon, but actually suggesting an increase to 3s. Their surprise will be in no way lessened by the knowledge that the British Transport Commission is already in a grossly favoured position, in that the fuel oil used by its own rapidly increasing fleet of diesel railway engines and railcars is altogether free of tax; indeed it might have been thought, from the railway point of view, that the less said about fuel tax the better.

The explanation for Mr. Brebner's letter is not, however, far to seek. Large as the B.T.C. road interest may be, by far its greatest concern is its "sick child," the railways. The railways are competitors with the roads, in the field both of passengers and of goods, and particularly on the passenger side (because of dieselisation) this competition is daily growing in intensity. From the railways' angle, therefore, the more millstones hung around the necks of

their competitors the better. Thus the economics of road transport, according to Mr. Brebner, should be artificially distorted for the benefit of the railways, regardless of the interests of the public—surely a concept entirely out of keeping with the whole spirit of the last Transport Act.

Road transport, both passenger and goods, is quite prepared to meet the challenge of a modernised railway system. There is no desire to see the railways saddled with a burden of special taxation such as road transport now has to carry. Parity should be achieved, not by taxing rail as well as road, but by giving freedom from taxation to both.

The present situation, whereby rail pays nothing, and road pays 2s. 6d. a gallon, is grossly discriminatory, and Mr. Brebner's suggestion that the degree of discrimination should be increased goes beyond all bounds.

Yours faithfully,

R. E. HYSLOP
General Secretary,
The Municipal Passenger Transport Association (Inc.)
F. A. WALKER
National Secretary,
The Passenger Vehicle Operators' Association Limited
R. L. HOWLETT
Secretary,
The Public Transport Association Inc.
R. MORTON MITCHELL
THOS. GRAY
Chief Executive Officer,
The Road Haulage Association Limited
Hon. Secretary,
The Scottish Road Passenger Transport Association

Locomotives or Multiple-Unit Sets?

May 1

SIR,—My letter in your issue of April 5 has drawn a good many words from Messrs. Weil and Rodgers, but, as I feared, no proof that axle-hung motors are any harder on the track than other arrangements. To call it an axiom is not enough; after all, at one time it was held to be an axiom that the earth was flat.

Both correspondents seem to hold the misconception that bad riding and heavy wear necessarily go together, and Mr. Rodgers shows it especially by his reference to the Chelmsford line. They may do, but it is certainly not inevitable. Granted, however, that wear may be the cause of the trouble on the Brighton line, what reason can Mr. Weil advance for assuming that things would be any better if the same amount of traffic were moved at the same speeds by steam or flexible-drive electric locomotives, if that were possible? In so far as he may hold the motor suspension to blame, he is hardly reasoning objectively in blaming all multiple-unit stock for the defects of this 25-year-old pioneer and ignoring the dramatic motor and coach weight reductions achieved in the latest Southern Region express stock (which, to answer Mr. Rodgers parenthetically, was the subject of an article in your issue of August 31, 1956).

It would not be particularly valuable to deal with your correspondents' comments one by one, but I hope they will now realise that this is not a subject on which one may safely dogmatise, especially after only superficial consideration. The mistaken conclusions that can thus be reached are well exemplified by Mr. Rodgers' "solution" which would show little, if any, reduction in unsprung weight and would inevitably cost and weigh a good deal more than an equivalent coach with axle-hung motors. Some investigators have found that rail stresses are more closely related to the total axle load than to the unsprung part up to quite high speeds, so after all the expense and trouble, the track would probably fare worse.

Yours faithfully,

T. R. HUME

8, Highlands Avenue, Leatherhead

THE SCRAP HEAP

Jammed

A double-deck bus is reported to have become jammed under a bridge carrying the Bere Alston to Callington branch, at Gunnislake, Cornwall, but nobody was hurt.

Bare-Faced

From Reading, Pennsylvania, comes the news that the superintendent of the Reading and South-Western Street Railway recently issued orders to all employees that on and after April 1 they must dispense with their moustaches and beards. There is something in the date that suggests that the cruel edict is really a sample of Yankee humour.—From *"The Financial Times"* of May 3, 1897.

The Stimulus of Competition

Engineers in the past have lived and grown on competition, yet in recent years we have seen the growth of nationalisation with its elimination of much of the rivalry which once stirred our imaginations. Can we rouse the same public enthusiasm for achieving higher speeds now on the railways as once we did when races for pride of place to Scotland took place between rival companies? Did not this rivalry accelerate engineering development as well as creating public interest? And wasn't this worth while? It seems to me that we should get back more to

individuality, to independence both national and international, and to a way of thinking which incites our engineers to greater and more productive efforts.—Sir Arthur Whitaker, *President of the Institution of Civil Engineers*, at the annual dinner of the Institution.

New "Stars" at Swindon?

A plea for "more glamorous waiting-rooms in our railway stations" brought tears to my eyes. I hope the stage and the fashion houses will be willing to supply pretty girls to squirm about in front of those dreary grates filled with apple-rind, old newspapers, broken boots, umbrella-handles, and ice-cream cartons. Why not a fashion parade, showing the latest bathing slips, in the lamproom at Swindon, with an American star to cut an enormous cake in the shape of a railway engine? It would cost more, but as Talleyrand said to Fouché: "When you're in debt to the tune of 750 million million, what is an odd million more or less?"—"Beachcomber" in the *"Daily Express."*

Spoil Heaps Provide Cinder Track

The cinder track, put down at Melbourne University and so highly praised by Australian and international athletes in training for the Olympic Games, came from the overburden at the

Victorian Railways' Wonthaggi State coal mines. Many considered it superior to the track at the main Olympic Games stadium, soil for which was imported from England. Its hard, unyielding surface was conducive to fast times. The overburden, which is removed before the coal is reached, is left lying on the surface in spoil dumps, near the pit heads, and as it contains quantities of near coal is subject to spontaneous combustion. The smouldering heaps become, in effect, giant brick kilns. The material is crushed and is being used for roadmaking and footpaths in the district.

When the cinder training track at the University was being planned, the authorities heard of the Wonthaggi coal by-product and the Railways Department made quantities available for the pre-Games training project. . . . International athletes returned to their homelands with glowing reports of the record-breaking University cinder track. Maybe the railways have been instrumental in laying the foundations of a new Australian industry with a great export potential.—From the *"Victorian Railways News Letter."*

Dog's Dilemma

A Labrador dog was recovered after being lost for five days in the Underground between Monument and Liverpool Street stations. After it had appeared briefly at Tower Hill Station, R.S.P.C.A. officials entered the tunnel and a gang of platelayers set out to meet them from the Monument. After a 2-hr. search the dog was found unhurt at Aldgate Station.

Help Yourself

(Light luggage barrows in the N.E. Region; see page 548)

Should you find the station porter
Isn't there, suppress the snorter
Which is welling up within you,
As you strain each nerve and sinew
To transport your bits and pieces;
Wait until your choler ceases.

Let no ill-judged inclination
To unwise pontification
Animate you. Do not bellow
For the porter, who, poor fellow,
For some good, if unknown reason,
Varying, doubtless, with the season,
May be busy round the station,
On some innocent occasion,
And perspiring at all pores
Doing someone else's chores.

In this egocentric age
Self-help stunts are all the rage,
Though it may seem tough at whiles
Teaming up with Samuel Smiles.
The ebullience of the sparrow
Gets you nowhere; grab your barrow!
Single-handed automation
Has at least one consolation—
When you're toting your own grips,
Think of what you save on tips!

A. B.

Motive Power Contrast



Photo]

[K. Westcott Jones

Fisherman's Wharf, San Francisco. The locomotive belongs to the (California) State Belt Railroad, which operates 67 miles of docks line

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

INDIA

New Oil Wharf at Vizagapatam

With the construction of one of the two new quay berths at Vizagapatam, the first phase is complete of the plan to enable the port to receive tankers bringing in crude oil for the new refinery of Caltex Oil Refining (India) Limited at Vizagapatam. The refinery is to handle 675,000 tons of crude oil per year. Construction of two berths was taken in hand by the South Eastern Railway. The second oil berth was due for completion recently. Transfer of the administrative control of Vizagapatam Port from the South Eastern Railway to the Ministry of Transport has not interfered with the construction of this project, which continues to be undertaken by the railway.

The completed wharf consists of 13 twin wells of monolithic design, each well measuring 42 ft. along the wharf and 26 ft. across on reinforced concrete well curves. The steining of these wells is of rubble masonry in cement mortar with cement concrete cores and sand filling. These wells have been sunk to an average depth of about 50 ft. below ground level.

NIGERIA

Progress in Engineering Works

The relaying of 55 miles of the Kafanchan-Jos branch of Nigerian Railways has now been completed, including extensive realignment involving heavy earthworks and culverting. The Port Harcourt-Enugu relaying has begun and 30 miles were completed by the end of March. Advance planning for

relaying of the Lagos-Ibadan section has now begun.

Remodelling, including resignalling, of three major stations, Jos, Ibadan, and Makurdi, has been completed and work is nearing completion at Offa, Minna, Zaria, Kano, and Enugu. Out of a total of 22 new crossing stations 18 are either completed or in hand, which represents a considerable acceleration of the original railway five-year plan under which it was estimated that this programme would not be complete until 1960.

The Nigerian Railway Corporation has substantially extended the use of wireless communication, and to operate this new system a training school to accommodate 20 pupils has been opened at Ebute Metta. A consulting architect has been engaged to prepare a plan for the proposed central training college at Zaria for advanced technical courses comparable to those available in the United Kingdom. These projects are additional to the existing extensive training organisation.

RHODESIA

New Wagon Shop for Bulawayo

A new wagon shop is being built at Bulawayo adjacent to the existing shops. It will be 540 ft. long by 150 ft. wide and provision will be made for extension at a later date. Earthworks, trackwork and foundations are being built departmentally, but the new shop is being constructed by contract.

The building will be of the steel frame type with corrugated iron sides and an asbestos roof of a type new to railway

shops in the federation. Instead of the familiar sawtooth construction, the roof will be of the even pitch type with special glazing to diffuse the heat, but at the same time provide the maximum amount of light.

Remodelling of Bulawayo Station

Good progress is reported on the remodelling of Bulawayo passenger station. The accompanying illustration shows erection of a steel-frame platform canopy over one of the new platforms. The roofing will be of corrugated asbestos. A recently completed platform and canopy of similar pattern can be seen in the background.

February Traffic Figures

Rhodesia Railways broke all previous records for the transport of chrome during February with a total of 78,166 tons, against 67,805 tons in January; of this total 63,874 tons were consigned to Beira, 12,407 to Lourenço Marques, and 1,885 to the Union of South Africa. During February, 158,330 bags of maize were exported, bringing the total for January and February to 275,490.

Copper railed to Beira amounted to 20,713 tons; to Lourenço Marques 15,247 tons, and the Union 1,890 tons—a total of 37,850 tons. To the north from Wankie 143,645 tons of coal and coke were despatched, and to the south all demands for coal and coke were met with 147,915 tons. Coal and coke railed totalled 291,560 tons in February.

EAST AFRICA

New Berth at Mombasa

By the end of 1957 No. 10 berth at Kilindini will be ready for limited use. The transit shed to be used with the berth, which will be the largest at Kilindini, covering 120,000 sq. ft., should be completed by the second half of 1958. It is hoped that the 240 berth cylinders, which are being sunk in the sea bed to depths of over 100 ft., will be in position by July or August.

BRAZIL

Equipment for Paulista Railway

The Export-Import Bank loan of U.S. \$12,800,000 to the Cia. Paulista will finance the purchase in U.S.A. of 38 diesel locomotives, 28,000 tons of rails, and electric traction, signalling, and C.T.C. equipment. The loan is repayable in 10 years.

Westinghouse Air Brakes

The National Railway Department has been authorised to purchase 95 sets of Westinghouse air brakes at a cost of 2,540,000 cruzeiros, to be installed in the passenger and freight vehicles now being built in Brazil.



Steel-frame canopy in course of erection at Bulawayo passenger station, which is being remodelled

New Rolling Stock

In 1956 the Brazilian railways acquired, or ordered, 141 diesel-electric locomotives and 2,045 wagons of various types, including 186 imported from abroad. The 1957-60 programme provides for the purchase of 153 diesel-electric locomotives, 5,540 passenger and freight wagons, 284,000 tons of rails, 5,000,000 sleepers, and 11,000,000 cu. metres of stone.

VENEZUELA

Underground for Caracas?

A large-scale programme of railway improvements is in progress. Among projects under discussion is understood to be a new transport system for Caracas, which may incorporate either an underground railway or a monorail, or possibly both. Contracts for work in Venezuela usually involve long credit terms.

UNITED STATES

New P. & L.E. Marshalling Yard

The Pittsburgh & Lake Erie Railroad is laying out a new fully automatic marshalling yard at Struthers, Ohio. The 34 classification tracks will be equipped with electro-pneumatic wagon retarders, automatic switching, electronic speed control, electronic computers, and every other modern facility. Cab signals will be used to control the movement of the shunting locomotives, from the receiving yard to the crest of the hump two sets

of lineside and four locomotive equipments will be linked with a control system at the east end of three approach tracks in such a way that only one selected locomotive at a time will receive the necessary signal to proceed towards the hump. The new yard will replace five existing yards in this area.

Cuyahoga River Bascule Span

The 375-ft. bridge carrying the Baltimore & Ohio Railroad over the Cuyahoga River at Cleveland has recently been provided with a new main opening span 255 ft. in length; it is one of the longest single-leaf bascule spans in the world. The new span carries a single line, is designed for Cooper's E.60 live loading, and has 10-panel through-type Warren trusses. To prevent obstruction to the heavy river traffic, it was erected vertically in the open position, and this is also the normal position in service as rail traffic is not heavy. The pier supporting the dead load of the open bridge and the operating mechanism rests on twelve 2 ft. 6 in. caissons embedded 5 ft. in bedrock at a depth of 130 ft. below the bottom of the pier.

AUSTRIA

"Throughout" Numbering of Trains

Several international express trains are to be renumbered from June 2 so that their numbers correspond with those used by adjacent administrations. As a result, trains will bear the same

number throughout their journey on certain lines, including Amsterdam-Vienna, Ostend-Vienna, and Rome-Verona-Innsbruck-Munich.

WESTERN GERMANY

New Works on Hamburg Hochbahn

A new sub-surface booking hall was brought into use at the Jungfernstieg terminus of the Hamburger Hochbahn on February 1, in connection with the extension of the underground line from Jungfernstieg to the Hauptbahnhof, described in *The Railway Gazette* of August 3, 1956. The new hall includes luggage lockers and provision for the future interchange subway with the adjacent Rathausmarkt station on the circle line. Tracks will shortly be laid in the first section of the new extension, from Jungfernstieg to the Fischmarkt, for use as terminal roads to increase the capacity of Jungfernstieg station and provide a more frequent peak-hour service to Ochsenzoll.

JUGOSLAVIA

Diesel-Hydraulic Locomotives

The first of three C-C type 2,200-b.h.p. diesel-hydraulic locomotives built by Krauss-Maffei for the State Railways, and equipped with Maybach engines and Mekydro transmission, has just undergone trial trips on passenger and freight trains over the German Federal Railway between Munich and Treuchtlingen, in Bavaria.

Publications Received

Roues Elastiques à Caoutchouc pour Matériel Roulant sur Voies Ferrées (Railway Wheels with Rubber Shock Absorbing Components); by A. M. Hug, Consulting Engineer, Zurich; reprinted from *Revue Technique Suisse* (Berne). Illustrated. The author, well known for his contributions to technical literature dealing with railway matters, especially in connection with rolling stock, outlines here the story of the development of the elastic type wheel, effected in an endeavour to give quieter running on tramways and railways combined with reduced wear and tear. The several designs produced by the various manufacturers are illustrated and their leading features clearly described, also the progress made in applying them on certain transport undertakings, some of which are of considerable importance. The adoption of the elastic wheel has greatly increased the comfort of travel on rails and its attraction for the public wherever it has been tried.

Hiduminium 100.—The application and properties of Hiduminium 100, and of shell moulding as applied to castings in Hiduminium are given in a series of illustrated leaflets issued by High Duty Alloys Limited, of Slough. Typical applications of Hiduminium include heat exchanger parts up to 550°C.,

special duty pistons for diesel and internal combustion engines, turbine compressor blades, and so on. Although Hiduminium 100 sheet is difficult to form by accepted methods for mass production of deep drawn components, excellent results are said to have been obtained by means of Dydzacking, a process developed and patented by Mark Tyzack & Sons Ltd., Sheffield. Details are also given regarding shell moulding as applied to castings in Hiduminium.

British Oxygen. An illustrated booklet issued by the British Oxygen Co. Ltd., Bridgewater House, Cleveland Row, London, S.W.1, reviews the activities and achievements of the British Oxygen Group of Companies, since the original factory was opened just over 70 years ago. The illustrations, mainly in colour, are of a high standard; an interesting feature is a number of pages on which contrasting applications of the group's products are shown.

Bedlam's Lascar.—A manual has been produced by the Bedlam Asbestos Co. Ltd., Lascar House, Hounslow, Middlesex, of the company's jointings and packings. This publication has been compiled to assist all users of its products, to derive the fullest benefit from their correct application in actual service. Service recommendations are covered and notes on the correct instal-

lation of the products are given at the beginning of each section. Space is devoted to a brief survey of Auto-Klean self-cleaning strainers, manufactured by an associated company.

Mark 1 Propeller Fans.—A brochure issued by Woods of Colchester Limited, Braiswick Works, Colchester, describes the manufacturer's range of ring mounted and diaphragm mounting fans, and fan speed regulators. Another leaflet, "Ancillary Equipment for Propeller Fans," deals with miscellaneous items of equipment, wire guards, wall cowls, fan chambers, and so on, for use with the company's standard fan range. Copies of both publications may be obtained from the Publications Department of the firm.

Guide to Belgium. By C. A. Thompson. Ilford, Essex: Belux Publications, 44, Suffolk Road. 7½ in. x 5 in. 124 pp. Paper covers. Illustrated. Price 4s. 6d.—This, the fifth edition of this compact guide, gives essential details of nearly all places in Belgium likely to interest the tourist, with some useful information on public transport facilities and other matters of practical interest, including—a welcome and unusual feature in a guide book—the availability of English newspapers. Wisely, no attempt is made to give particulars of hotels and pensions, for which the reader is referred to the official list.

Efficiency in Diesel Locomotive Sanding

Experiments on the Southern Pacific Lines, U.S.A., with the object of securing economy

THE problems associated with the sanding of diesel locomotives have been receiving the attention of the Southern Pacific Lines for some years. Costs attributable to sand contamination of permanent way, drainage, and so on, are estimated to be at least \$500,000 annually, while the cost of purchasing, transporting, drying, and storage amounts to approximately \$450,000 a year. Two research studies were sponsored, the first at Battelle Memorial Institute, and the second at the Stanford Research Institute, and, to apply research work on a practical basis, a joint committee of the railway, representing the motive power and engineering departments, was formed.

Effective Sanding

From the data developed by laboratory and scale model tests, it was concluded that the minimum quantity of sand required for effective wheel slip control is $\frac{1}{2}$ lb. per min. at 14 m.p.h., the critical speed at which wheel slip occurs on heavy grades. It was also considered that a lesser quantity of

are designed with air tubes $2\frac{1}{2}$ in. in length. Tests were made with longer tubes, starting with $3\frac{1}{2}$ in. and working backwards, with the result that a 3-in. long tube is the optimum length, permitting a wide range of adjustment, within which lay the delivery of the desired quantity of $\frac{1}{2}$ lb. per min.

Sand Velocity

It was necessary to study other components of the sanding system to determine how the desired sand velocities at the discharge nozzle could be obtained, at the same time avoiding major changes in existing equipment. This led to a detailed study of the control valve, and various experiments were carried out with metering screws, shown in Fig. 1, the standard orifice being $\frac{5}{64}$ in. dia. Metering screws were removed, and openings to atmosphere capped with solid screws of shorter length, the result was that air velocities at the sanders were increased beyond reason.

From this it was concluded that some point between the $\frac{5}{64}$ in. dia.

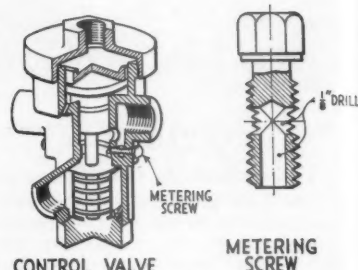


Fig. 1—Control valve and metering screw

valves used on the railway, both operated by a common drivers sanding valve. Piping was manifolded so that each equipment could be operated independently from a common connection at 140 p.s.i., the same pressure as on the locomotives.

To evaluate performance, sand patterns were captured on galvanised sheet coated with a tacky paint film. The test equipment also included a small cyclone head designed to trap the sand delivered over timed periods, after which sand was weighed to determine delivery per min. A special sand camera was also evolved to indicate and record the spread and density of pattern thrown by different types of nozzles, and also to determine the affect of side winds on the patterns.

The practical tests were carried out on shunting engines with open sand pipes and with various designs of rubber and metal nozzles. Nozzles of moulded rubber were eliminated because of the action of the sand on the rubber surface, and the cheapest and most suitable material was considered to be ordinary commercial steel pipe. The accepted design, which is shown in Fig. 2, is a simple fabricated nozzle made from standard pipe and fittings which lends itself to ease of manufacturing, and precise fitting to existing sand pipes. Emphasis is given to the necessity for precise alignment of sand pipes and nozzles.

Quality of Sand

Experience gained during the tests emphasised the necessity of using sand of proper quality to obtain positive results. The quality of sand used on the test had the following screening; held on 10 mesh, none; 20 mesh, 5 per cent; 65 mesh, 95 per cent; through 200, none; clay or fines by volume, none. While it was realised that sand of this quality was not available economically all over the system, it was considered that the investigation of sand supply should be co-ordinated by the two committees who are investigating the use of, and the purchase and distribu-

(Continued on page 536)

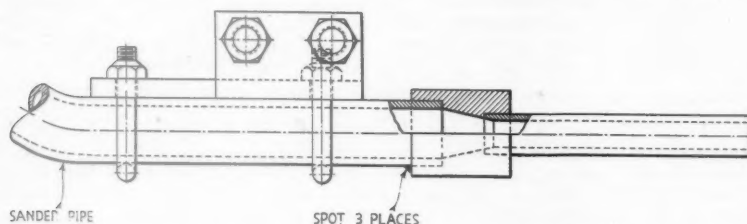


Fig. 2—Accepted design of sanding pipe, manufactured from commercial quality steel pipe

sand was more effective than excessive amounts in accomplishing the desired results.

With the object of a practical follow-up of these recommendations under actual operating conditions, the committee decided that the optimum amount of sand should be $\frac{1}{2}$ lb. per min. per wheel. Standing tests at the company's Bayshore shops confirmed that $\frac{1}{2}$ lb. per min. per wheel is the minimum practical amount, thus providing for a 50 per cent utilisation delivered by the nozzles, based on the theoretical minimum quantity; this allowed for unavoidable loss.

Possible Economy

Investigations showed that the sanders were actually delivering about 3 to 5 lb. per min. per wheel, and in some instances as high as 12 lb. per min. Delivery of the optimum of sand would therefore reduce the amount by at least $\frac{1}{6}$ th. A study was made to determine what improvements could be made in the sand traps, some of which

orifice in the metering screws, and the entirely clear passage, would produce desired results. Metering screws were made with openings in increments of $\frac{1}{64}$ in. dia., starting at $\frac{3}{32}$ in. dia. Resultant tests showed that an orifice of $\frac{1}{8}$ in. dia produced velocities at the nozzle to ensure proper placement of sand at wheel contact point, and to offset affects of side winds well in excess of 35 m.p.h. the highest speeds the instruments would read. Frequent checks on test engines also showed that any tendency in the sand to solidify was reduced considerably.

As previously mentioned the limitation placed on nozzle design to deliver $\frac{1}{2}$ lb. of sand per min. per wheel, is based on the premise that utilisation of sand should be at least 50 per cent, regardless of the position of wheel-rail contact area. To evaluate performance of sand nozzles of various types a special device was used, the basic equipment consisting of sand box, piping, and so on, as installed on a locomotive, together with two types of control

British Railways Iron Ore Wagons

Hopper type design of 730 cu. ft. capacity, to further increase in steel production in Scotland

IN our issue of February 15, mention was made of the £20 million expansion programme of Colvilles Limited directed to increasing the firm's steel production. In this connection British Railways, in co-operation with the company, have designed a special 33-ton capacity iron ore hopper-type wagon to haul imported iron ore from General Terminus Quay on the Clyde, to their Clydebridge steelworks at Rutherglen, and the new steelworks at Ravenscraig, Motherwell. Altogether,

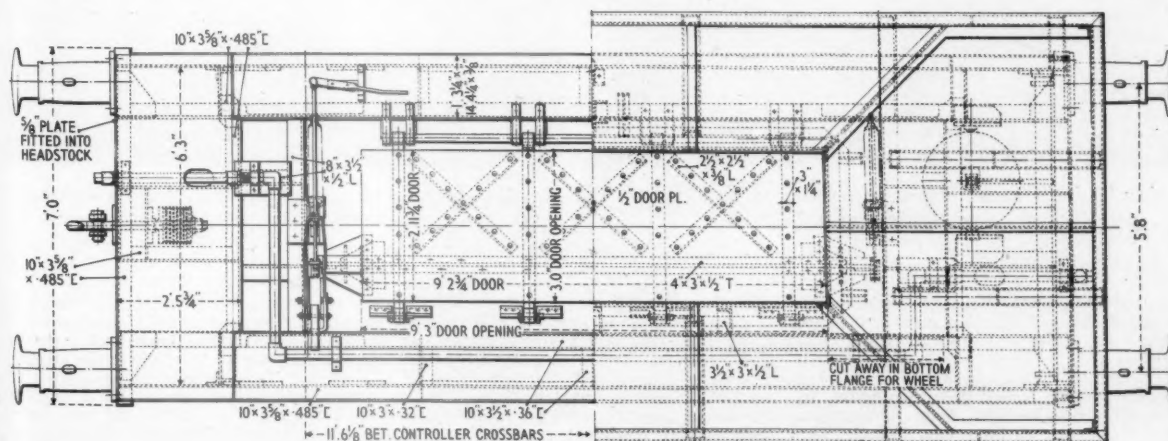
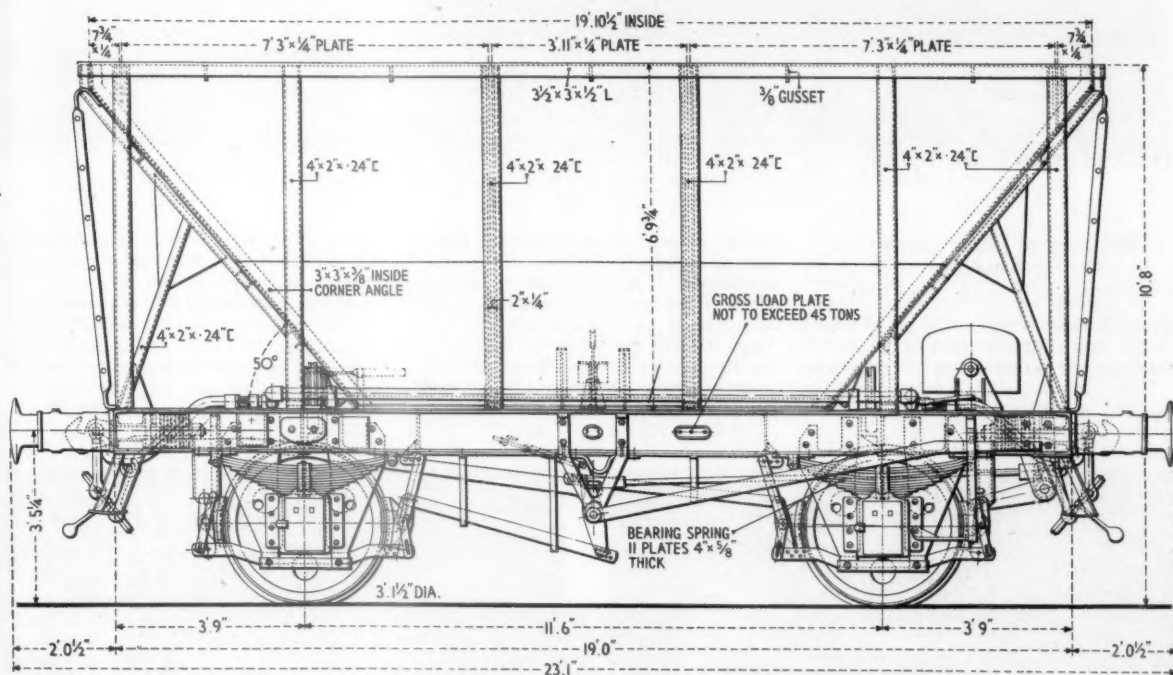
270 of these wagons are being built at the Shildon Wagon Works of the North Eastern Region.

There were several important factors to be considered with reference to the design of the wagons, firstly, the circuit for which the wagons are required restricts the axleloading to 22½ tons with an 11-ft. 6-in. wheelbase, and this, together with the necessity for maintaining a buffer length of approximately 23 ft., and a bottom door opening of 9 ft. 3in. with 50 deg. angle hopper

sides, determined the basic features of design. Another factor which had to be considered was the variation in density of different ores, the lighter ores requiring the maximum cu. capacity within the 4 ft. 8½ in. gauge.

The principal dimensions are as follow:—

Length over headstocks	19 ft.
" " buffers	23 ft. 1 in.
Extreme height from rail	10 ft. 8 in.
Interior length	19 ft. 10 $\frac{1}{2}$ in.
" height	6 ft. 9 $\frac{1}{2}$ in.
" width	8 ft.
Capacity	730 cu. ft.



Elevation and plan of iron ore wagon, showing constructional details and principal dimensions



British Railways hopper type wagon of 730 cu. ft. capacity

The wagons are of all-steel and of welded construction, with $\frac{1}{4}$ in. thick mild-steel body plates, bodyside stan-

chions are designed to present flat faces to the beams of wagon tipplers. The single bottom door, which can be

opened and closed from one side, is supported on cams welded on a circular shaft, the shaft being held in position by a lever catch and french pin which has to be removed before the door can be opened.

The door is released by means of a locking lever which rotates the cam shaft allowing the door to swing open assisted by the load, compressing the door closing springs at the same time; the door is automatically locked in the open position, and released by a lever at the end of the wagon.

Buffing and drawgear is of the Continental type, the buffers being self-contained, fitted with seven rubber springs, and having a projection of 2 ft. 0 $\frac{1}{2}$ in. The drawbar and screw couplings are also of Continental type; four rubber springs are maintained behind the headstock.

Vacuum and hand brakes are fitted, the block arrangement being of the clasp type, with eight independent brake blocks. The vacuum brake cylinder is 18 in. dia. and a brake power of 9.82 tons is provided. The tare weight of the vehicle is 11 tons 4 cwt. and the capacity is 730 cu. ft.

Efficiency of Diesel Locomotive Sanding

(Concluded from page 534)

tion of sand respectively, otherwise it is felt that improvements in the use of sand may be nullified to a major extent.

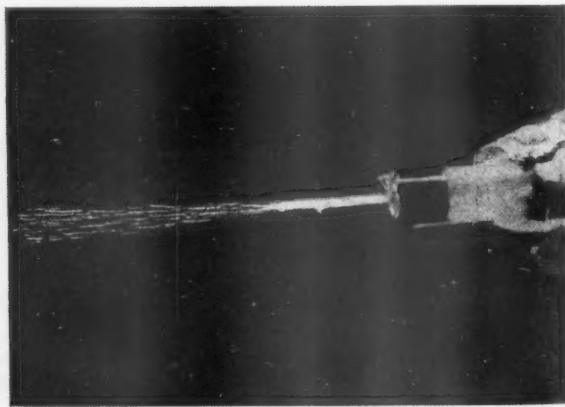
The investigating committee also pointed out that operating with a re-

duced amount of sand made it imperative to maintain sanders in an operative condition. The presence of moisture either from external sources, or from compressed air caused sand to pack. Steps should be taken to ensure sand on the locomotive is maintained in a dry condition especially during mechanical washing. Moisture in compressed

air pipes can be eliminated by automatic drain valves on the main reservoirs, water separators in the air lines, and moisture traps ahead of the sanders. Oil from air compressor lubrication, it was pointed out, also had a detrimental effect, and should be corrected at source. Alignment of sand nozzles should be checked periodically.



Blow back during head wind of approximately 18 m.p.h.



Sanding in similar circumstances, with experimental sheath

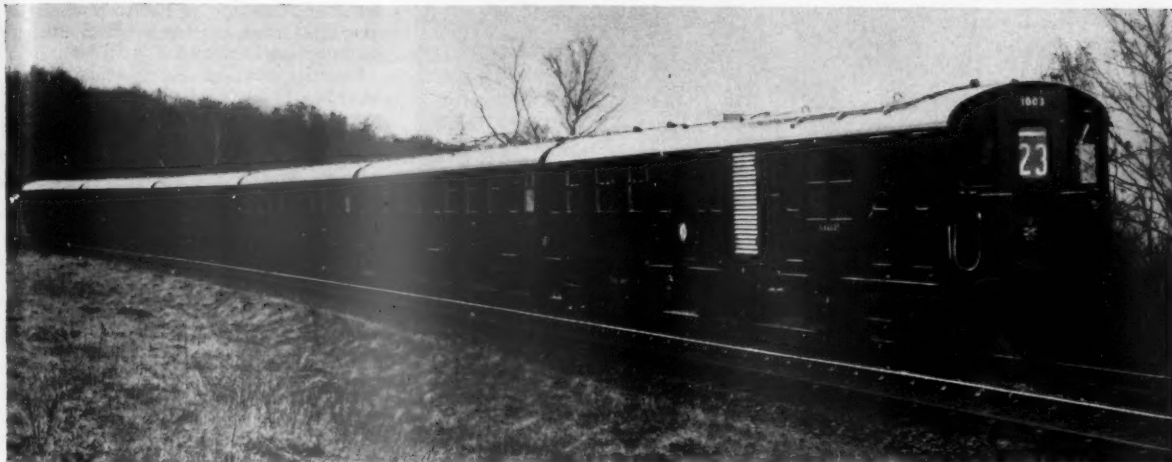
BRITISH TRANSPORT WATERWAYS IMPROVEMENTS.—Sir Reginald Kerr, General Manager, British Transport Waterways, announced at Birmingham recently that the British Transport Commission has approved a £959,000 programme of improvements for the River Severn and the Gloucester & Sharpness Canal. The Commission hopes that this programme, which is part of its £5,500,000 development

plan, announced in January, 1956, for the principal inland waterways, will further increase the substantial traffic carried on this important waterway route to the Midlands. The work to be undertaken on the River Severn and the Gloucester & Sharpness Canal comprises bank protection; special dredging; construction and extension of locks; mechanisation of lock gates, sluices, and bridges; re-construction

of swing bridges; provision of dredging plant; and work on workshops and other premises. An entirely new lock is to be built at Gloucester to augment the existing Gloucester lock, which controls the entrance to the River Severn. It will accommodate either one large and one small tanker or two small tankers. Its construction involves some re-arrangement of railway lines within the Gloucester Docks area.

Multiple-Unit Diesel-Electric Trains for Southern Region

*Six-car vestibule sets of 1,000 h.p.
for Hastings line via Tunbridge Wells*



Six-car diesel-electric set with English Electric equipment, on London—Hastings service

AS from this week, British Railways, Southern Region, has placed into revenue service the first four sets of diesel electric six-car formation with diesel-electric power transmission.

These sets, of which 10 are planned to be built at present, represent the first application to British Railways of the diesel-electric form of transmission with this type of multiple unit consist. Such units can be coupled together to form a 12-car train, and will be used to provide improved timings on both business and holiday trains on the sometimes heavily-graded Hastings line.

Another feature new to British Railways is the provision of two position adjustable seats in the first class compartments. In this design, the seat squab can be pulled out some six inches, the seat back being attached to the seat to give a less upright sitting position.

The trains are planned to cover the 62-mile non-stop journey between London and Hastings in 90 min. in each direction. During business hours four diesel-electric trains will operate, replacing three steam hauled services providing 2,000 seats against 1,550 in steam trains.

In each six-car set, power is supplied by two 500-h.p. supercharged diesel locomotives, one at each end of the train. The make-up of six-car sets is two diesel-electric motor coaches one at each end, and four corridor trailers.

The construction of the coaches is being undertaken by the Ashford and Eastleigh Carriage Works of the Southern Region, the underframe and bogies being built at Ashford and the coach bodies and interiors being finished at Eastleigh.

The underframes are of the standard

British Railways welded construction 56 ft. 11 in. over headstocks for the first seven units and 63 ft. 5 in. over headstocks for all subsequent units.

Bogie Construction

Trailer coach bogies are of standard single bolster type with inside swing hangers and are fitted with Hoffman roller bearings; wheels are 3 ft. 6 in. dia.

The motor coaches are carried on two of the more recent type of motor bogies with Hoffman roller bearings and 3-ft. 4-in. dia. wheels. Traction motors are in the trailing bogie

of the motor coach, by reason of the weight of the power equipment.

Because of the restricted loading gauge of the Hastings line between Tunbridge Wells and Crowhurst, it has been necessary to use straight-sided bodies with a width of 8 ft. 0½ in. over the panels.

Both motor coaches are identical and contain from leading end:—driver's cab, engine room, guard's and baggage van, and second class passenger saloon with vestibules at each end. Of the four trailer coaches, three are second class coaches of the open type and the fourth is a first class side-



Interior of inspection shed at St. Leonards West Marina, showing the two-level inspection pits



Open second class saloon, showing seating and lighting arrangements and luggage racks

corridor coach. Each trailer coach has two lavatories.

The controls, consisting of a master controller and brake controller, and auxiliary electrical apparatus, are located in the driving compartment, the layout being similar to that on the latest Southern Region electric multiple-unit stock.

The power unit, oil and water coolers, fuel supply unit and filters, are located in the engine to the rear of the cab. The power unit is three-point mounted on rubber pads, quick-release pipe fittings being incorporated.

Power Equipment

Power is provided by an English Electric 4SRKT/II pressure-charged 4-cyl. diesel engine set to give 500 b.h.p. at 850 r.p.m., direct coupled to an English Electric 6-pole generator of 330 kW. output and an overhung 13.2 kW. 6-pole auxiliary generator. The main generator supplies two 4-pole nose-suspended, axle-hung traction motors connected in permanent parallel and mounted on the motor coach rear bogie, which is identical to and interchangeable with those used on the most recent Southern Region electric stock. The continuous rating of the motors is 205 h.p. each. The auxiliary generator supplies low tension circuits at 90 V. for lighting, control gear and battery charging.

The main generator has a continuous rating of 600 A. at 550 V. and its output is regulated by an English Electric auto-load-regulator; this regulator also controls the traction motor field weakening.

Control equipment consists of electro-pneumatic and electro-magnetic contactors and group switches. All of the power contactors and relays are carried in one case suspended from the under-

frame. The remaining control gear is carried in the auxiliary cupboard which forms the partition on the offside of the driver's cab.

In addition to the power equipment mentioned above, the following items of equipment are suspended from the underframe between the bogies; air reservoirs, air compressor, brake cylinder, electro-pneumatic brake unit, two fuel tanks and two battery boxes.

The air compressor is a Westinghouse 90-V. D.H. 25 unit. The two fuel tanks have a total capacity of 340 gal., enough for about 800 miles. The two D.P. Battery lead acid 40-cell batteries have a

capacity of 92 A-hr. at the 5-hr. rate; one supplies current for starting the diesel engine, while the other supplies the coach lighting. The latter battery may be used to start the diesel engine in an emergency.

Air brakes of the Westinghouse automatic and self-lapping electro-pneumatic type are fitted, as used on Southern Region electric stock.

Electric heating is provided and current is supplied from the main generator, a combination of convectors and radiator heaters being employed.

Accommodation

In the first seven units, passenger accommodation is provided as follows: motor second brake, 22 seats; trailer corridor first, 42 seats; and trailer open second, 52 seats; totalling 242 seats per six-car unit.

In the later sets, the motor second brake coach has 30 seats; trailer corridor first, 48; trailer corridor second, 60 seats; totalling 288 seats in each six-car train.

Leading particulars are as follow:—

	Short frame	Long frame
Length of under-frame ..	56 ft. 11 in.	63 ft. 5 in.
Estimated tare weights:		
motor second brake ..	54 tons 2 cwt.	55 tons
trailer corridor first ..	28 tons 10 cwt.	29 tons 5 cwt.
trailer open second ..	28 tons 10 cwt.	29 tons 5 cwt.
Length of six-coach set ..	358 ft. 3 in.	397 ft. 3 in.
Total tare weight of set ..	222 tons 4 cwt.	227 tons
Maximum speed ..	75 m.p.h.	
Balancing speed on level tangent track ..	68 m.p.h.	
Traction motor speed ratio ..	65 : 16	

The special maintenance facilities at St. Leonards West Marina include a four-road-inspection shed with two-level pits and a fuelling plant.



First class compartment, showing adjustable seats and fixed armrests

ELECTRIC RAILWAY TRACTION SECTION

Development in 50-Cycle Techniques

THERE is already ample evidence of the support for the British Railways 50-cycle scheme from industry which was promised in a statement issued by the British Electrical & Allied Manufacturers' Association when this electrification project was announced. The placing of orders for a variety of motive power and fixed equipment shows how much spadework had been done before the large-scale adoption of industrial-frequency a.c. was announced, encouraged by the original pilot scheme of 1952 on the Lancaster-Morecambe-Heysham line in the London Midland Region. Overhead construction, recognised as a key factor in the economic use of high-voltage a.c., had been studied for some time at the special proving ground built at Rye Hey, Prescott, by British Insulated Callender's Cables Limited, and experience of performance in commercial operating conditions has been obtained by this company on a route-mile of double track on the Lancaster-Morecambe-Heysham system, where its overhead equipment has been installed since 1953. Experience gained in this way has been embodied in the design of overhead work to be installed by B.I.C.C. on the Manchester-Crewe and Colchester-Clacton/Walton sections.

Another outcome of research into problems associated with 50-cycle traction has been the B.I.C.C. specially-screened telecommunication cable. In such an application, protection of the screening against corrosion is of particular importance, and is afforded by a patent P.V.C. and rubber sandwich serving introduced by the maker some time ago for power cables. A final 10-kV. test of the serving can be carried out after the cables have actually been laid.

Signalling on 50-cycle lines will make its major demands on development work where lines at present operated with d.c. traction, and equipped with a.c. track-circuits, are converted to the 50-cycle system. Contracts announced so far have been for installations on lines at present worked by steam, but the opportunity has been taken to put in apparatus of types which would serve for track-circuiting on electrified lines both before and after their conversion from d.c. to a.c. Orders have been placed in connection with the Colchester-Clacton-Walton and the Crewe-Manchester pilot schemes. The work in the Eastern Region will be undertaken by the Siemens & General Electric Railway Signal Co. Ltd. Where single-rail d.c. track-circuits cannot be used, with signalling apparatus protected from a.c. by chokes, this company is proposing an a.c. supply from motor-generators at 83½ cycles, relays being protected by resonated filters to oppose 50-cycle traction current. It has been found advisable, also, to provide a separate 83½-cycle screened distribution system for the relay local coils as a precaution against some back-feeding of 50-cycle traction current to the 83½-cycle busbars. The installation by the Westinghouse Brake & Signal Co. Ltd. on part of the Manchester-Crewe line will include equipment in which a 50-cycle supply is converted to a 75-cycle signalling frequency by static apparatus at each track circuit, the a.c. passing through a frequency discriminator and rectifier unit to operate a standard d.c. track relay.

The use of Class H insulation for motors and smoothing chokes has been mentioned in details so far given of traction equipment for British Railways 50-cycle locomotives and motor coaches. These materials have now undergone extended trials in d.c. traction on the London Transport system. Among the experiments conducted has been the running in "R" stock motor coaches for some three years of four G.E.C. traction motors which have been subjected to increased temperature rise by restricting the air flow to a very small amount. Their satisfactory performance in these conditions gives con-

fidence in the greater use of Class H insulating materials in 50-cycle motive power.

So far, the characteristic British contribution to 50-cycle development has been the germanium traction rectifier produced by the British Thomson-Houston Co. Ltd. The L.M.R. motor coach equipped with this unit has undergone trial running both on the Lancaster-Morecambe-Heysham line and between Fenchurch Street and Bow Junction. The latter trials included a short-circuit test in which the master controller was modified so that in its normal weak-field position it actually put a dead short across the field. The motors flashed over and the substation circuit-breakers cleared the fault; on examination after the test the rectifier was found to be completely undamaged. Complete single-anode mercury-arc rectifier equipments, with transformers and tap-changers, suitable for underframe-mounting, have been developed by the English Electric Co. Ltd. and have been in service on the Lancaster-Morecambe-Heysham line.

East Kent Coast Electrification

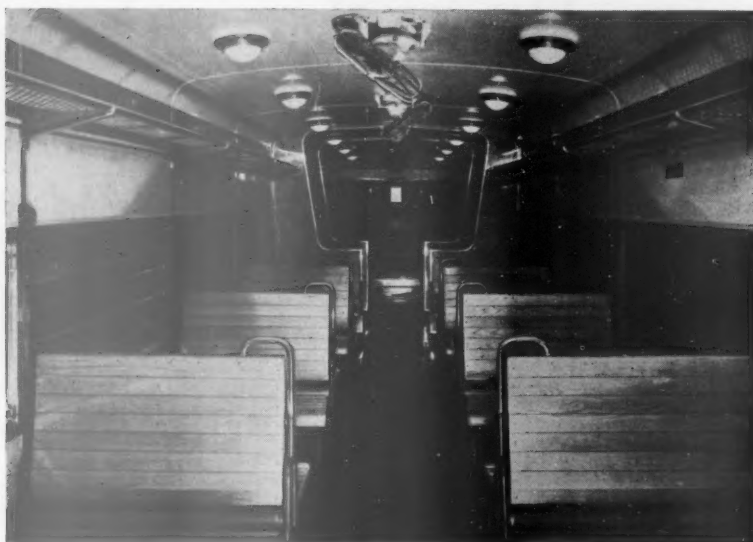
THE orders for substation equipment and cables reported in our Contracts and Tenders columns last week cover both phases of the Southern Region programme for electrification at 750 V. d.c. from Gillingham and Sevenoaks to the East Kent coast, with the line from Ashford to link up with the existing Sussex coast electrification at Ore. As has been the practice in the London area change-of-frequency scheme, both pumpless steel tank and glass bulb mercury arc rectifiers are to be installed, the former in 32 and the latter in 31 substations. In the first phase of the scheme, the G.E.C. is to supply pumpless, steel-tank, mercury-arc rectifiers and 33-kV., 750-MVA metalclad switchgear at substations from Gillingham to Faversham, Broadstairs, and Ramsgate, including the Sheerness branch; d.c. high-speed circuit-breakers on these sections will be by Bertram Thomas (Engineers) Limited. The section from Faversham to Canterbury and Dover Marine will be equipped with glass bulb rectifiers by the Hackbridge & Hewitt Electric Co. Ltd., while the British Thomson-Houston Co. Ltd. will provide the high-tension a.c. switchgear and the d.c. high-speed circuit-breakers.

In phase 2, the G.E.C. and Bertram Thomas equipment mentioned above will cover the Sevenoaks-Ashford and Paddock Wood-Maidstone-Ashford sections, while the Hackbridge & Hewitt and B.T.H. equipment will be installed from Ashford to Dover; Ashford to Canterbury, Minster and Ramsgate; Minster to Buckland Junction (Dover); and Ashford to Ore. Substations and track-parallel huts in both phases will be under remote supervisory control from control rooms at Canterbury and Paddock Wood, which will be equipped with G.E.C. apparatus similar to that supplied for the London area change-of-frequency scheme. High-tension distribution will be carried out by oil-filled cable by W. T. Henley's Telegraph Works in the section from Gillingham via Faversham to Ramsgate, including the Sheerness Branch, and from Faversham to Dover and Folkestone. The system will be similar to that recently installed in the London area where the installation of Pirelli-General oil-filled cables was the first of its kind for railway traction supply in this country.

In view of the present British Railways diesel-electric programme, it seems probable that this form of motive power will be preferred to electric locomotives for traffic which cannot be worked by multiple-unit stock. Presumably, if electric locomotives were used, it would be necessary to adopt a motor-generator system similar to that of the three units in the Central Section in order to avoid difficulty in negotiating lengthy gaps in the live rail.

Italian-Built Metre-Gauge Electric Stock for India

Six additional four-car sets of improved design for the Madras-Tambaram suburban services



Interior of compartment showing seating arrangement, and cross partitions near entrance doors

THE 18 miles long Madras Beach-Tambaram suburban section of the former South Indian (now part of the Southern) Railway was first electrified in 1931. Twenty-four three-coach articulated electric multiple-unit trains were originally supplied for this service; the stock was described and illustrated in the July 24, 1931, issue of *The Railway Gazette*, and are still in continuous service. Each of these sets is composed of a centre motor coach with a driving trailer at each end. Power of each set

is 480 h.p., with overhead line voltage of 1,500 d.c. fed from mercury arc rectifiers in substations en route. The total seating capacity of each set is 196, comprising 30 upper class and 166 lower class. The electrical equipment was supplied by the English Electric Co. Ltd., while mechanical parts and coach work were built by the Metropolitan-Cammell Carriage & Wagon Co. Ltd.

The number of passengers carried during the first year of operation, 1931-32, was 3.3 million, but during the war

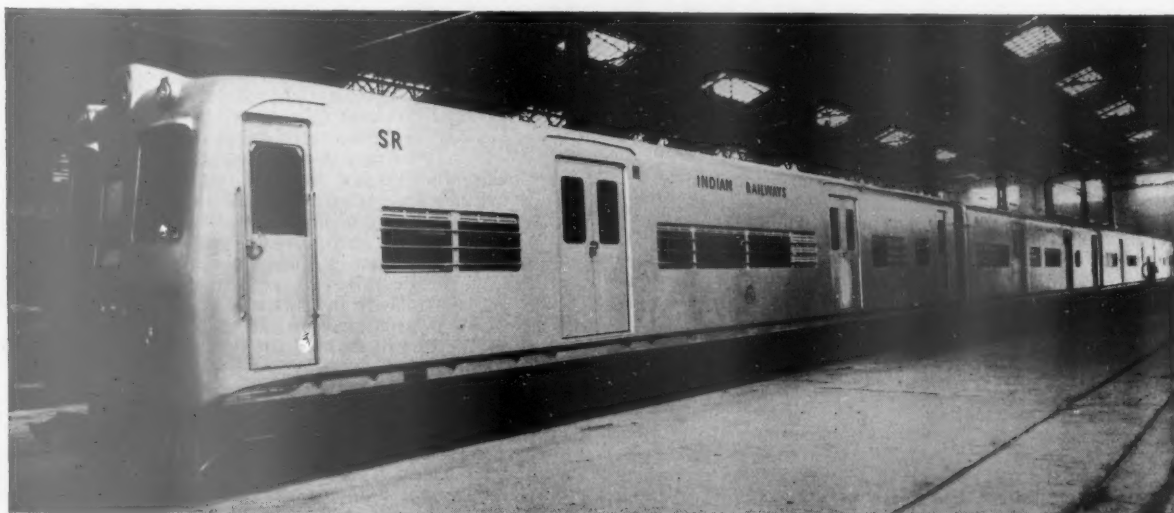
years particularly, there was a rapid increase in the number of passengers travelling by the suburban service, and at the present time over 30 million passengers are carried annually. Train frequency, originally 90 per day, and now around 200, is still insufficient to prevent considerable overcrowding during rush hours, and the railway has ordered six additional multiple unit sets from the Breda Electromechanical & Locomotive Company, Milan. Two of these sets were put into service on April 13, 1956, this coinciding with the silver jubilee year of the opening of this Madras suburban electric service.

Composition and Construction

The new stock contains certain improvements compared with the older units, including Formica panelling, polished light alloy handles, and passenger-operated oscillating electric fans. Each set consists of four coaches, of which the second is a driving coach, the others being trailer cars; the two end coaches are each provided with a driving compartment. Wide sliding doors are provided, and actinic-tinted glass, and aluminium louvres are fitted to the windows to protect passengers from the strong light.

Total seating capacity of each of the new units is 306 and ample standing room is provided to cope with rush hour conditions when up to twice as many passengers can be carried. Compartments for luggage and H.T. equipment are provided in the motor coach. Operating conditions are more arduous than those in European countries. High air humidity and the possibility of mon-

(Continued on page 543)



Completed train at the makers' works before shipment to India

Multiple-Unit Stock for Netherlands Railways

Four and two-car electric train sets of composite design for interurban services



Netherlands Railways multiple-unit four-car set during trial run

THE Netherlands Railways have recently placed in service the first of a number of standard-gauge multiple-unit sets for their interurban services. Altogether, some 77 sets will be placed in service, consisting of 47 four-car, and 30 two-car sets, the contract for which was allotted to Werkspoor N.V. Amsterdam, J. J. Beijnes, Beverswijk, and Allan N.V. Rotterdam; the electrical equipment has been supplied partly by Heemof N.V. Hengelo,

and Metropolitan-Vickers Electrical Co. Ltd. The four-car train set is composed of three second class cars and one first class, the cars being carried on two-axle bogies. The bogies of the end cars are motored. The trains are streamlined, with driving compartments at each end. Flexible communication gangways with double diaphragms, are provided between the cars. The four-car set has a total weight of 213 tonnes and an overall length of

323.4 ft. The capacity is as follows:—

Seating capacity, first class	..	48	passengers
Standing " " "	..	40	"
Seating " " second class	..	192	"
Standing " " "	..	100	"
Total	..	380	"

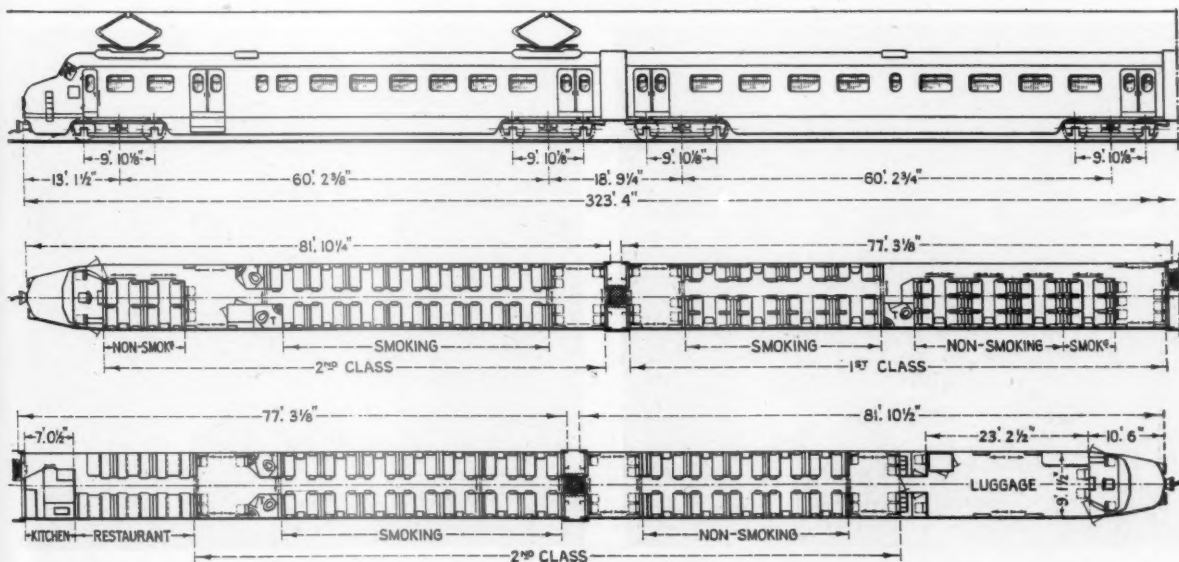
The two-car train set is composed of a second class, and a first and second class car. The cars are carried on two-axle bogies, the outer end bogies being motored as in the four-car train sets. This set is basically similar to the four-car set with flexible gangways, and so on, and is also streamlined, with driving compartment at each end. The two-car sets have a total weight of 109 tonnes, and an overall length of 164 ft. The carrying capacity is as follows:—

Seating capacity, first class	..	24	passengers
Standing " " "	..	20	"
Seating " " second " "	..	96	"
Standing " " "	..	40	"
Total	..	188	"

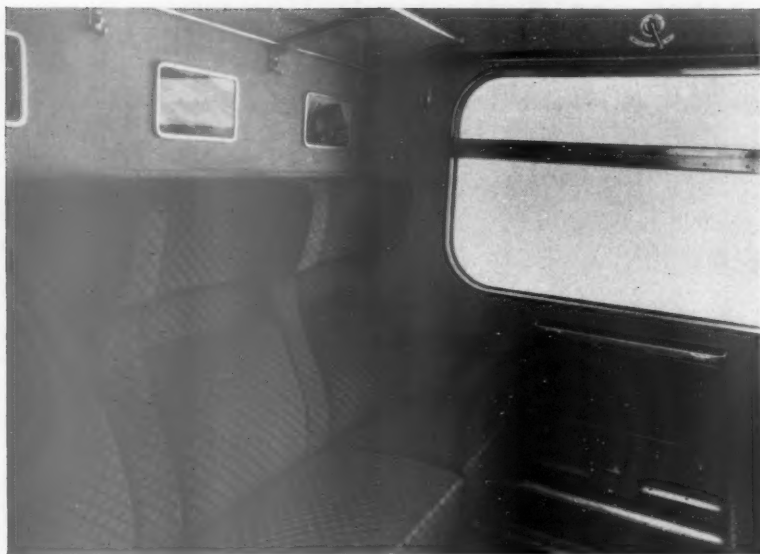
Design Features

Steel is used throughout in the carriage body construction, and the whole body is welded. Integral parts of the body consist of normal channel, angle, or T-sections, with a floor of corrugated steel plate. A reinforced nose protects the driving cabs in case of accidents; the bogies are of completely welded construction. The doors, ventilation ducts, and many parts of the interior, are made of aluminium alloy.

The windows are divided into a lower and an upper part, the lower part is



Elevation and plan of multiple-unit stock, with principal dimensions and layout



Arrangement of first class side-corridor compartment

fixed, and has double glass windows, with an air space between; the upper part is a single pane and can be raised. The kitchen in the second class car in the four-car train, is equipped with boiling plates, refrigerator, coffee machine, and a hot water boiler; the supply is 100 V. d.c. Seating accommodation in the restaurant compartment adjacent to the kitchen is provided for 22 passengers. A number of portable tables are available for the serving of refreshments or meals; these can be placed between seats in the various compartments.

The maximum speed of the train sets is 87 m.p.h.; accelerating on a straight level track with full power output, the

sets can attain a speed of 75 m.p.h. in about 3 min. The d.c. current of 1,500 V. is fed via the pantograph, to the nose suspended traction motors having a rating of 270 h.p. each. Drive is by means of single transmission (1:2.59) with resilient gearwheels.

By means of the master controller in the driver's cab, motors can be notched in five running positions—a series position with full field, with all resistances in circuit for shunting purposes. A deadman's device is incorporated. For each four traction motors there is a complete set of electro-pneumatic control gear. The installation is protected by a roof-mounted main fuse; in a second series of train sets a rapid

circuit breaker is installed, in this case the four-car sets have two seats less.

The air brake, of the Westinghouse high-speed type, is inexhaustible, and permits graduated application and release; clasp brakes with double cast-iron brake blocks are used. A high-speed device is incorporated in the brake system so that in case of emergency braking from speeds above 37 m.p.h., a higher brake cylinder pressure than normal is obtained. When speed is reduced to 28 m.p.h. the high-speed brake pressure is automatically released, and the normal brake cylinder pressure retained in the brake cylinder. Air is supplied by two electrically-driven compressors.

Each driving cab is well laid out, and equipped with a master controller, control switch, compressor switch, brake valve, speedometer, volt meters—one for the overhead line, and one for the control voltage—ammeter and air pressure gauges. Other items include a centrifugal switch for high-speed brake, push-button control for pantographs, and for resetting the overloading and overhead line relay, together with head and signal light switches, and pilot lamps. Headlights can be dimmed. Pilot lamps indicate unreleased air-brake or hand-brake, tripping of overhead relay, pantograph contact, high-speed brake contact at speeds above 37 m.p.h., slip of driving axles, tripping of differential relay, and so on.

Automatic Coupling

Automatic couplers are provided. Two or more sets, and streamlined postal vans, can be coupled and operated in multiple-unit by one driver. Coupling of drawgear, air-brake piping, and electrical circuits is automatic. For uncoupling, the driver depresses a pedal in one of the adjacent cabs, admitting



Interior of first class smoking compartment, showing through corridor



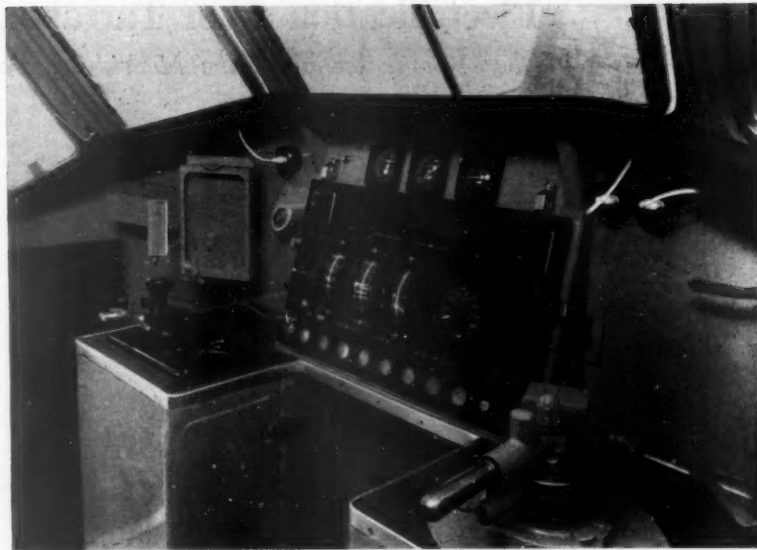
Second class smoking compartment, showing fluorescent centre lighting

compressed air to a cylinder in the coupler head which affects the draw-gear, isolates the air brake piping, and uncouples the electric circuits. The pedal remaining depressed, one of the train sets can be driven away. On release of the pedal, the mechanical and electrical parts are ready for recoupling, the air brake pipe remaining closed as long as the couplers are not fully coupled up.

Electrical Equipment

Heated fresh air is supplied to the passenger compartments, and for this purpose, each car is equipped with electric resistance heaters of 5 kW. in two groups of 17. Air, which is taken in by a fan from the outside through a filter, passes the air heater, and is then conveyed by means of ducts to outlets below the seats; temperature is regulated by two thermostats in each car. If the temperature rises above a predetermined level, one of the two groups of resistance heaters can be switched off. In warm weather the same fan is used to provide forced ventilation without heating.

Two motor generators of 15 kW. for each four-car set, and one of 15 kW. for each two-car set, supply current for the 100-V. d.c. control and lighting circuits and auxiliaries, and in the four-car set, for the kitchen. Two 80-cell storage batteries of the nickel iron type, having



Driver's cab, showing the instrument panel layout in the vertical position; pilot lights are at base of panel

a capacity of 100-amp. hr. at 10-hr. discharge, are fitted to four-car sets; one storage battery of the same capacity is fitted in the two-car sets.

All cars are provided with fluorescent lighting, fed by 220 V. a.c., 100 cycles.

This current is generated by a 3-kW. centrifugal mercury converter, which converts the 100 V. d.c. supplied by motor-generators or battery. Two converters are fitted in the four-car set, and a single one in the two-car set.

Italian-Built Metre-Gauge Electric Stock for India

(Concluded from page 540)

soon flooding have necessitated that all the electrical and mechanical items are designed to prevent the ingress of water, dust and sand, and able to withstand the high ambient temperature. Externally the sets are painted to give an aluminium finish.

Electrical Equipment

The motor coach is fitted with four 700 V. d.c., 160-h.p. motors connected in series/parallel, across the 1,500 V. d.c. line voltage, with two field weakening steps incorporated. Speeds up to 90 km. per hr. (56 m.p.h.) can be attained. The equipment on the H.T. table is actuated by electro-pneumatic contactors. Control circuits are operated on a 60 V. d.c. supply. Auxiliaries are situated in the H.T. compartment, and include a Westinghouse 4 V. 110 exhaustor, a DH 16 Westinghouse compressor, and an 8 kW. vee-belt driven generator for lighting and fans.

Leading dimensions are as follow:—

Gauge	Metre
Overall length of 4-car unit	237 ft. 1½ in.
Overall width	8 ft. 11 in. (max. 9 ft.)
Overall height (pantograph locked)	12 ft.
Tare weight of 4-car unit	86.9 tons
Passenger capacity	Lower class 280 Upper class 26

Electrical equipment was supplied by Breda Electromechanical & Loco-

motive Company, bogies provided by Ansaldo S.A., Geneva. General body construction was by Industrie Meccaniche & Aeronautiche Meridionali, Naples. All axles are fitted with SKF spherical roller bearings. Vacuum brakes are fitted throughout.

Extension of the electrification is now planned to Chingleput, 38 miles from Madras, and subsequently to Villupuram (105 miles from Madras), the point of bifurcation (a) of the metre-gauge main line via Tanjore to Trichinopoly, Dhanushkodi (for the steamer service to Talaimannar, in Ceylon), Madura, Tuticorin and Trivandrum; (b) of the chord line to Trichinopoly. The project includes conversion of the third (steam) track between Madras and Tambaram; this conversion, and that of the Chingleput-Villupuram section, envisages electric haulage of main-line passenger and goods trains, but details are not yet available.

THROUGH DUTCH-BELGIAN ELECTRIC WORKING.—Inter-running between the Dutch and Belgian electrified systems at Roosendaal is scheduled to commence on June 2, but will at first be limited to the international express trains, which will be hauled from Brussels to Roosendaal by Belgian National Railways electric locomotives operating at 3,000 V. d.c. from Brussels to the change point about a mile south of Roosendaal and at 1,500 V. d.c. thence to Roosen-

daal station. Local passenger services will continue to be diesel-worked until the autumn, when a two-hourly service of dual-voltage electric trains will be introduced from Brussels to Amsterdam. The line from Roosendaal to the Belgian frontier station at Essen has been changed from right-hand to left-hand running.

ELECTRIFICATION PROGRESS IN GERMANY.—The electrification programme of the Federal Railway for 1957 provides for conversion to electric operation with effect from June 2 of the main lines Hamm-Dortmund-Düsseldorf, and Mannheim-Darmstadt-Mainz (Bischofsheim). Later this year electric operation will be inaugurated on the sections Darmstadt-Frankfurt (Main); Offenburger-Karlsruhe-Bruchsal; Würzburg-Aschaffenburg-Frankfurt; and Ludwigshafen-Mainz-Koblenz. In all, some 450 route-miles are to be electrified this year. In 1959 the Western German electrified route-mileage will amount to over 2,000 through further conversion of the following sections: Remagen-Koblenz; Bruchsal-Graben Neudorf; Karlsruhe-Graben Neudorf-Mannheim, all in 1958; also Regensburg-Passau; Bietigheim-Heilbronn; Karlsruhe-Pforzheim-Mühlacker; Remagen-Düsseldorf; Hamburg-Bergedorf; and Hamburg Holstenstrasse-Stellingen, all in 1959. The two last-named sections are part of the Hamburg S-Bahn.

Electrification from Tarragona to Reus

Further 10-mile section of the Madrid-Barcelona line electrified



Inaugural train in Tarragona Station, hauled by Co-Co series 7600 Alsthom locomotive

THE Tarragona-Reus section of the main Madrid-Barcelona line was opened for electric traction on January 12. The section consists of 10 miles of double track, with a total length of electrified line, including tracks in stations, of 32 miles.

Substation

Continuous current at 3,300 V. is distributed to the contact lines on the section by the Reus substation, which is fed by current at high voltage from the Sociedad Fuerzas Eléctricas de Cataluña S.A. This substation is equipped with two groups of mercury vapour air-cooled rectifiers, each group having a nominal capacity of 2,000 kW. The capacity is such that a 50 per cent overload can be accepted for 2 hr., or one of 200 per cent for five min. In this substation, the equipment for which has been built by General Electrica Española, there is space for the installation of a third group of rectifiers, should an increase in traffic warrant their provision.

A mobile substation, rated at 2,000 kW, nominal capacity, is held by the R.E.N.F.E. for use on this section. The substation is mounted on a gondola wagon and serves to reinforce the power fed to the line if for any reason one of the groups should accidentally go out of service.

Catenary

The type of catenary employed is identical to that successfully used by R.E.N.F.E. on other sections already electrified at 3,300 V. It consists of two copper contact wires each of

107 sq. mm. (0.165 sq. in.) section suspended from a carrying cable also of copper, with a section of 153 sq. mm. (0.237 sq. in.). On the open lines, the catenary is supported by brackets and metal posts, and in the stations it is suspended from steel cables which cross the lines transversely.

Locomotives

Locomotives being used on the service are Series 7600, type Co-Co, built by Alsthom, which have a continuous output of 3,000 h.p., and Series 7800, type Bo-Bo-Bo, built by Westinghouse (U.S.A.) and the Sociedad Española de Construcción Naval, also with a continuous output of 3,000 h.p.

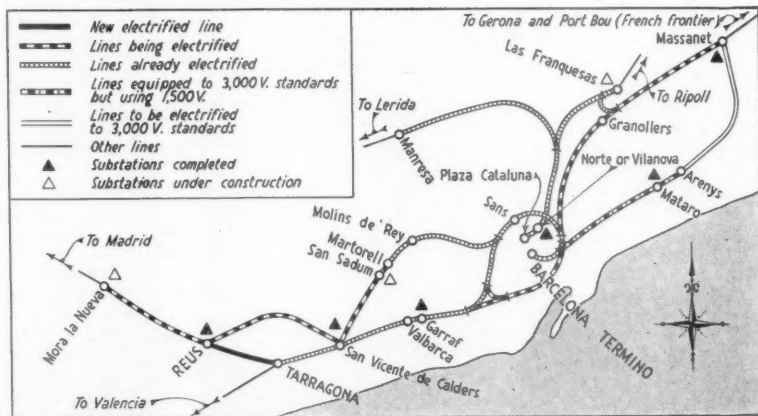
In the Series 7600 locomotives the body is carried on the bogies by means of oscillating pivots, and the six traction motors are carried by the frames of the bogies and completely suspended, working on to the corresponding axle through an Alsthom elastic coupling. With a weight of 120 tons, they can reach a speed of 78 m.p.h. In the Series 7800 locomotives, the body is carried by three bogies each with two axles, and each bogie having two nose-suspended traction motors which drive their respective axles through a simple gear and pinion transmission. The weight of these locomotives is also 120 tons, and they have a maximum speed of 81 m.p.h.

In both types of locomotive, the traction motors can be coupled in series, series-parallel, and parallel, so that, with the various power notches, the best use can be made of the locomotive having regard to the type of train being hauled.

The locomotives of Series 7600 are fitted with regenerative braking, and the Series 7800 have powerful rheostatic brakes. In addition, both types have compressed air brakes on the locomotives, and vacuum brakes in the train, providing systems of braking which can be used independently or in conjunction.

Railcars

For the train service on the "Ocho Catalan" (Catalonian "8") lines, 10 railcar units are being built in Switzerland and 31 in Spain. Each of these units is formed of two railcars, of 1,040 h.p. continuous rating, and an intermediate trailer car. They can travel at a maximum speed of 75 m.p.h. and can carry 640 passengers in each train unit. Their large capacity together with the possibility of coupling units together, enables trains to be made up, to meet any demand, thus ensuring an effective service.



R.E.N.F.E. present and future electrification in the Barcelona area

RAILWAY NEWS SECTION

PERSONAL

Sir George H. Nelson, Bart., Chairman of the English Electric group of companies, was installed as this year's President of the Institution of Mechanical Engineers at a ceremony held in London on April 26.

Mr. Saghir-ud-Din Ahmed Suhrwardy, who, as recorded in our May 3 issue, has been appointed Director General (Railways),

intendent, Principal Railway Liaison Officer, Deputy Chief Traffic Manager, Deputy General Manager (Personnel), and Deputy General Manager, B. & A. Railway. In 1947 he became Traffic Manager on the Eastern Bengal Railway, and, in November of that year, he was appointed General Manager of the system. Mr. Suhrwardy was a member of the Indian Railways delegation to the International Railway Congress held at Lucerne in June, 1947.

with the north station in the harbour area. In 1945 Sayed Rida went to Kassala to supervise the construction of an oil reservoir and to do river protection work at Suki River Station. The following year he was recalled to Atbara before proceeding to the United Kingdom for a two years' training course with Messrs. Coope & Partners, Consulting Engineers, London. On his return to the Sudan in August, 1948, he was appointed Resident Engineer in charge



Mr. S. A. Suhrwardy
Appointed Director General (Railways),
Pakistan



Sayed Abu Bakr Ali Rida
Appointed Chief Engineer,
Sudan Railways

Railway Division of the Ministry of Communications, Pakistan, was born on August 8, 1904. He began his career in 1928 with the Eastern Bengal Railway as a probationer in the Transportation (Traffic & Commercial) Department of the Superior Revenue Establishment of State Railways, and was confirmed as Assistant District Traffic Superintendent in 1931. Mr. Suhrwardy was promoted to be District Traffic Superintendent in 1934, and, from March 8, 1938, to October 9, 1940, worked as D.I.V.S. on the Eastern Bengal Railway. During the 1939-45 war, Mr. Suhrwardy was granted an emergency commission in the D.I.U. and, from December 1, 1943, was granted the rank of Hon. Lt.-Colonel. In recognition of his services, he was made an M.B.E. in 1943. In 1942 he became Superintendent Transportation (Senior Scale) on the Bengal & Assam Railway. He was appointed Principal Railway Liaison Officer to the B. & A. Railway in March, 1944, and, from September of that year until 1947 served in various capacities including Divisional Super-

intendent, Principal Railway Liaison Officer, Deputy Chief Traffic Manager, Deputy General Manager (Personnel), and Deputy General Manager, B. & A. Railway. In 1947 he became Traffic Manager on the Eastern Bengal Railway, and, in November of that year, he was appointed General Manager of the system. Mr. Suhrwardy was a member of the Indian Railways delegation to the International Railway Congress held at Lucerne in June, 1947.

From August 1, 1950, he has served with E.C.A.F.E. as Chief of the Transport Division.

Sayed Abu Bakr Ali Rida, formerly Assistant Chief Engineer of the Sudan Railways, who, as recorded in our March 29 issue, has been appointed Chief Engineer of that system, was born on August 2, 1921, and educated at the old Gordon Memorial College, Khartoum. In 1940 he joined the then newly-formed School of Engineering, now part of the University of Khartoum, for a five-year engineering course which included a year's training in the shops of the Mechanical Department of the Sudan Railways at Atbara. After obtaining his Diploma with distinction he joined the Engineering Department of the Sudan railways in February, 1945, as a Civil Engineering Assistant and was attached to the Drawing Office for three months. He subsequently transferred to Port Sudan Harbour to take part in the construction of a causeway and bridge to link the town station

of the Atbara New Water Supply Project. He was promoted to be Assistant Engineer in June, 1949, while still on this work. In 1950 Sayed Rida was promoted to be District Engineer, Kosti, subsequent to which date he also worked on the survey of the new line from Sennar Junction to Wad En Nail. In 1953 he transferred to Port Sudan as Assistant Harbour Engineer, returning to Atbara Headquarters on transfer in January, 1954, as Assistant New Works Engineer. He was promoted to be Assistant Chief Engineer in July, 1955, the position he held until selection as Chief Engineer in January, 1957. Sayed Rida became an A.M.I.Struct.E. while in London in April, 1948, and an A.M.I.C.E. after his return to Atbara in December, 1949.

Mr. R. B. Hoff, Stores Superintendent, Western Region, British Railways, has been appointed Chief Stores Officer, British Transport Commission Headquarters, succeeding Mr. A. Forbes Smith, who retires at the end of this month.



Sayed Y. M. Sukkar
Appointed Assistant Chief Engineer,
Sudan Railways



Mr. R. L. Charlesworth
Appointed Assistant to General Manager,
Western Region



Mr. E. A. Rogers
Appointed Assistant Signal Engineer
(Modernisation), Eastern Region

Sayed Y. M. Sukkar, Maintenance Engineer, Sudan Railways, who, as recorded in our March 29 issue, has been appointed Assistant Chief Engineer of that system, was born in December, 1906, and educated in the Gordon Memorial College, Khartoum. In 1925 he graduated from the School of Engineering and joined the Sudan Railways as an Assistant Surveyor, in which capacity he worked on the survey and construction of sidings in Port Sudan Harbour serving the new South Quays. He subsequently made a survey for the railway extension from Sennar to Gedaref and for the construction of the Rahad and Dinder bridges and new stations on the Gezira Scheme. In 1933 Sayed Sukkar was appointed Superintendent of Ways & Works and was responsible for the maintenance of track on a section on Kassala line. In 1938 he was promoted to be District Surveyor, a position he held until 1946. During this period Mr. Sukkar was connected with major work such as the Kosti tranship station, the construction of military sidings in Khartoum during the recent war, Gebelein accostage dredging, the Faras and Gebelein line extensions and soil erosion control at Erkowit Hill Station. In 1946 Sayed Sukkar became Senior Assistant Engineer and, in the same year, District Engineer. He was posted to Kosti District, and, in addition to his railway work, was a member of the Town Council, representing that council in the Blue Nile Province Council for many years. In 1952 he was transferred to Khartoum District and, in 1953, was Resident Engineer on the Singa-Rosseires Extension. He was elected President of the Sudanese Engineers Association for 1953. In 1954 he returned to Headquarters where he served on an extensive scheme of re-grading and lengthening Port Sudan line stations. In 1955 he was promoted to be Maintenance Engineer. In addition he directed railway extensions to the west of the Sudan. His new appointment dates from January, 1957.

The Minister of Transport & Civil Aviation, the Rt. Hon. Harold Watkinson, M.P., has appointed Mr. J. M. Moore to be one of his Joint Principal Private Secretaries with effect from May 1, 1957, in place of Mr. O. F. Gingell, who has been promoted.

Mr. R. L. Charlesworth, O.B.E., M.A., A.M.Inst.T., who, as recorded in our May 3 issue, has been appointed Assistant to the General Manager, Western Region, British Railways, was educated at Winchester and Hertford College, Oxford. In 1933 he joined the London Midland & Scottish Railway as a traffic apprentice and received the usual four years' training. After two years as a runner, he was appointed Acting District Controller, Huddersfield, on the outbreak of war. He was commissioned in the Royal Engineers in January, 1940, and served in France with 153 Railway Operating Company. He spent 2½ years as Staff Officer in the Middle East and was mentioned in despatches for service in the Western Desert. In 1943 Mr. Charlesworth was appointed D.A.D. Tn., 21 Army Group, and subsequently served in France, Holland, and Germany, being promoted A.D. Tn. After V.E. Day he was for some time in command of No. 1 Regional Railway Control team at Osnabruck, with the acting rank of Colonel, and was awarded the O.B.E. for services in North West Europe. In 1946, he became Assistant District Goods & Passenger Manager, Bristol, London Midland & Scottish Railway, and, in 1947, Steamship Superintendent, Belfast. In 1951 he became a Traffic Costing Officer at British Transport Commission Headquarters and was subsequently appointed Principal Traffic Costing Officer, Paddington. In 1955 Mr. Charlesworth was a member of the team of British Transport Commission Officers who went to Ceylon for two months to advise on the Ceylon Government Railways. He holds the rank of Colonel in the Royal Engineers' Army Emergency Reserve.

On May 4, Mr. C. Grasemann, former Public Relations & Advertising Officer of the Southern Railway, as Master of the Worshipful Company of Stationers & Newspapermakers, welcomed the Lord Mayor and the Prime Minister to the 400th anniversary celebrations of the granting of the Company's first Charter in 1557.

Mr. J. Douglas, Signal & Telegraph Inspector, Glasgow North Area, Signal Engineer's Department, Scottish Region, British Railways, has been appointed Area Assistant, Glasgow North Area.

Mr. E. A. Rogers, A.M.I.E.E., M.I.R.S.E., who, as recorded in our April 26 issue, has been appointed Assistant Signal Engineer (Modernisation), Eastern Region, British Railways, began his railway career on the former L.N.E.R. in 1925 as an apprentice at Finsbury Park. Two years later he was transferred to the technical staff of the Telegraph Superintendent, and, after gaining experience, was, in 1947, appointed Senior Assistant in charge of the Drawing Office of the Assistant Chief Engineer (Signals) at Kings Cross. Mr. Rogers became Indoor Assistant on the formation of the Signal & Telecommunications Engineer's Department, Eastern Region, in 1948, and was subsequently appointed Assistant Signal Engineer (New Works). In this capacity he was intimately concerned with the many major signalling schemes carried out in the Eastern Region in the postwar period. From August, 1953, until September, 1954, he was seconded to the United Nations Technical Assistance Administration at Principal Lecturer to establish their Railway Training Centre at Lahore, Pakistan.

Mr. J. L. Willoughby, Secretary, British Road Services, has been appointed Traffic Manager, British Road Services (Parcels) Limited.

In pursuance of the policy of establishing a new traffic organisation, the North Eastern Region of British Railways has appointed Mr. W. H. Vine, previously District Goods Manager, West Riding, as Commercial Officer, North Eastern Region. He will be responsible to the Chief Traffic Manager for all commercial functions in this Region.

Mr. J. A. Stevenson, Traffic Superintendent (Operating), Western and Southern National Omnibus Companies, Tilling Group, has been appointed Traffic Manager of the Thames Valley Traction Company, succeeding Mr. J. W. Dally, who is retiring. Mr. Stevenson received training in mechanical and electrical engineering as a premium apprentice with the former L.N.E.R. On completing this apprenticeship in 1936 he joined the Western National Omnibus Co. Ltd. as a trainee, subsequently becoming Assistant to one of the Area Superintendents

of the Eastern National Omnibus Company. From 1939 to 1946 he served in the R.A.S.C., and, on demobilisation, was first appointed Assistant to the Traffic Manager (Operating), Western National and Southern National Omnibus Companies, and, later, Assistant Traffic Manager (Operating). In 1952 he became Traffic Superintendent (Operating) of the two companies, the position he now vacates.

Mr. R. D. Armstrong, Comptroller of Canadian National Railways for the past three years, has been appointed Vice-President, Accounting & Finance.

We regret to record the death on May 1, at the age of 89, of Sir George Paish, a leading world authority on railway economics.

Mr. J. E. Clark, who joined the staff of British Oxygen Wimpey Limited when that company was formed last December, has now been appointed Deputy Manager of the Midlands District of British Oxygen Gases Limited with headquarters in Birmingham.

INSTITUTION OF MECHANICAL ENGINEERS

The following have been elected Associate Members of the Institution of Mechanical Engineers:—

Mr. J. P. Carrier, B.A.(Cantab.), W. H. Allen, Sons & Co. Ltd.

Mr. A. W. J. Cook, Crown Agents for Oversea Governments & Administrations, Engineering Inspection Department.

Mr. R. A. Craig, C. A. Parsons & Co. Ltd.

Mr. J. L. Hopkins, B.Sc.(Eng.)(Lond.), I.C.I. Ltd. (Billingham Division).

Mr. F. Horne, Chief Mechanical & Electrical Engineer's Department, Doncaster, Eastern and North Eastern Regions British Railways.

Mr. M. W. F. Jayaratne, c/o English Electric Co. Ltd., S. India.

Mr. J. M. Kloosterman, British Oxygen Engineering Limited.

Mr. F. R. Rogers, English Electric Co. Ltd.

Mr. B. Rowe, M.C., B.Sc.(Glas.), Humber Ports, Dock Office, Hull, Yorks.

Mr. F. J. Siddell, Head Wrightson & Co. Ltd., McKee Iron & Steel Division.

Mr. E. G. Skoll, Stewarts & Lloyds Limited.

Mr. M. H. L. Whitehouse, M.A.(Cantab.), British Engineers Association.

Mr. E. F. Ward has been elected an executive director of the South Durham Steel & Iron Co. Ltd.

Mr. A. E. Potter, Director of Expandite Limited, will leave this country on a tour of Expandite interests in France, Switzerland, Germany and Belgium on May 15.

Mr. J. M. Robb, Manager of Overseas Division, Expandite Limited, will leave this country on May 14 for a visit to France, Switzerland, and Italy.

Mr. F. A. Stanley and Mr. C. H. N. Peirce have been appointed directors of the Birmingham Railway Carriage & Wagon Co. Ltd.

Mr. E. S. Waddington, Manager of the Industrial Division of Philips Electrical Limited since 1933, has retired from the company's service.

INSTITUTION OF LOCOMOTIVE ENGINEERS

The following names have been added to the register of members of the Institution of Locomotive Engineers:—

Mr. J. A. Broughall, Electrical Engineer (Development), British Transport Commission.

Mr. C. J. Dadswell, Director, English Steel Corporation Limited.

Associate Members

Mr. W. Collins, Senior Mechanical Design Draughtsman, Traction Section, General Electrical Co. Ltd.

Mr. J. W. Longman, Foreman, General Machine Shop, Tata Locomotive & Engineering Co. Ltd.

Mr. A. C. Stewart, Inspecting Engineer, Scottish Region, British Railways.

Associates

Mr. H. R. Mills, Head of Poant Engineering Division, British Iron & Steel Research Association.

Mr. J. A. Shingleton, Manager, Combustion Heater Department, S. Smith & Sons (England) Limited.

As from May 1, 1957, Mr. S. Poole, formerly Regional Manager (Lighting & Electrical Appliances), Southern Region, Philips Electrical Limited, has been appointed Regional Manager of the newly-formed South West Region of the company. He

will be based at Bristol and will be responsible for Philips activities in those areas at present covered by Cardiff and Bristol branches. Mr. J. Jordan and Mr. D. E. Beard will continue as Branch Managers in their respective areas.

WESTERN REGION FIRST-AID MOVEMENT.—

The teams which gained the first nine places in the Western Region first-aid semi-finals competed in the final competition held in the Porchester Hall, Paddington, on April 16, 1957. The tests were set by Dr. M. M. Scott, of London; Dr. C. T. Newnham, of London, and Dr. K. P. Duncan, of Bath. A large number of spectators, including Officers of the Region, witnessed the contest. The subsequent presentation of prizes and trophies was presided over by Mr. S. G. Ward, Regional Establishment & Staff Officer, and the presentations were made to the winning teams by Mr. Arthur Chamberlain, Member, Western Area Board. The result of the test was announced by the Regional Ambulance Secretary, Mr. J. A. Martin. Out of a maximum of 500 marks, Swindon "B," winners of the Challenge Shield, gained 411, and Bristol D.O.S.O., winners of the Carvell Cup, gained 400½. The Henry Butt Bowl was presented to the Newport "B" team, who secured the highest position in the beginners' section in this year's competitions. A vote of thanks to the adjudicators and other helpers was proposed by Mr. A. C. B. Pickford, Chief Commercial Manager, and to Mr. Chamberlain and Mr. Ward by Mr. J. Dixon, captain of the winning team. The Swindon "B" and Bristol D.O.S.O. teams will represent the Region in the British Railways, Docks and London Transport (Railways) National Competition, in the Central Hall, Westminster, on June 5. The accompanying illustration shows (left to right): Drs. K. P. Duncan, C. T. Newnham and M. M. Scott, adjudicators; Messrs. A. Chamberlain, Member of Western Area Board; S. G. Ward, Regional Establishment & Staff Officer; J. A. Martin, Regional Ambulance Secretary; A. C. B. Pickford, Chief Commercial Manager; R. Burgoyne, former Regional Establishment & Staff Officer; C. H. Brazier, Director of Industrial Relations, B.T.C.; and H. G. Bowles, Assistant General Manager (Administration).



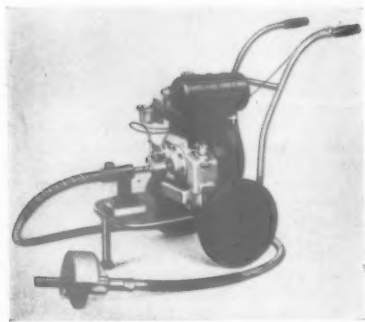
Mr. A. Chamberlain, Officers of the Western Region, and adjudicators at the finals of the Western Region First-Aid Competition

NEW EQUIPMENT AND PROCESSES

Multi-Purpose Track Maintenance Equipment

THE Flexmaster, a portable set of permanent way maintenance equipment, recently introduced, is designed to deal with a variety of operations, including sawing, grinding and drilling of rails and sleepers *in situ*.

The set consists of a power unit driving, through a flexible drive, a portable hacksaw machine, a light rail drilling attachment, a sleeper boring and coach screw

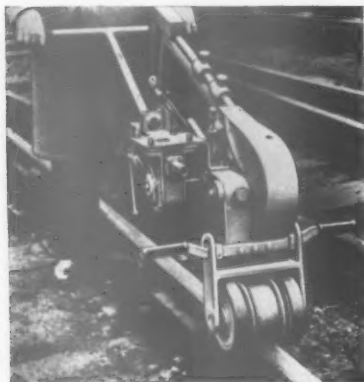


running attachment, a rail planing device and handpieces for the free grinding of rails. The fact that power is provided through a flexible drive is stated to allow attachments to be lighter than is the case with similar equipment which is already available.

Only one power unit is needed for all these applications which will normally be a 220 cc. trolley-mounted petrol engine, but if no heavy drilling is involved, a 120 cc. hand-carried engine is quite adequate. If desired, the equipment can be powered by an air motor or an electric motor through a flexible drive, or in the case of a saw, the electric motor or the air motor can be directly mounted on its frame.

The saw unit weighs 122 lb. and it can cut through a 113 lb. f.b. rail in about 7 min.; steel sections up to a maximum dimension of 7 in. are within the scope.

If great mobility is required, it can be equipped with wheels and a handle so



that one man can wheel it along the railway track. Alternatively this system enables it to be used in any yard with a reasonable surface.

The driller weighs 30 lb. and is designed to have a capacity of 1½ in. It is specially designed to fit the type of rail on which it is to be used. The handle is instantaneously detachable so that the drill can be left in position if traffic has to pass during the work. A coolant container with a fitted feed system is provided.

The rail planing attachment consists of a frame by means of which a ring grinding wheel is precisely located relative to the top of the railway line. The working depth of the wheel can be closely adjusted at will.

This planing attachment is used for restoring the correct level to the top surface of the rail and regaining complete surface alignment from rail to rail. It has been used where the welding up of rails into continuous lengths has been undertaken. The weight of the unit is 60 lb.

For the free grinding of rails, for example for removing the excess material from the sides of a weld, or from built-up point rails, a standard right-angle drive handpiece with a ring grinding wheel is used. A reversible screw running head with a sleeper drilling spindle completes the equipment.

With various other handpieces and attachments, the power unit and flexible drive can also be used in the workshops for other purposes, such as surface scaling, wire brushing, sanding, polishing, buffing, drilling and tube cleaning. Each machine and its connected equipment is guaranteed for six months from the date of sale.

Details of price and delivery may be obtained from the manufacturer, Flexible Drives (Gilmans) Limited, 195, High Street, Smethwick, Staffs.

Quick-Setting Clamp

THE W. M. F. Toolmakers' & Universal Clamp has been developed to minimise the time taken to use clamps of conventional design.

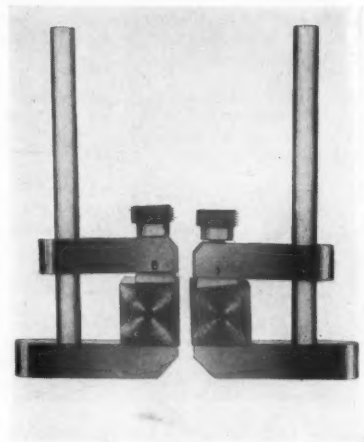
Of application to many operations in machining and fitting practice, it can be opened, it is stated, from completely closed to 3½ in. in 5 sec. instead of 3 min. with the normal clamp. It has a self-aligning jaw pad to 5 deg. off parallel or taper. The bottom jaw has a ground base for standing on the slide of a machining table; the grip being quite rigid, no jaw-balancing is necessary.

The top jaw is automatically held in position on the quick tightening of the adjusting screw. There is no double-sided obstruction and no screws are exposed or stick out from the clamp, enabling it to be held in a vice.

The self-aligning jaw-pad enables the clamp to be used freely, because it will not mark either soft ferrous or non-ferrous material or damage smooth surfaces.

The specification for the clamp includes: material, mild steel, case hardened and precision ground; extend of jaws, 0 to 3½ in.; throat depth, 1½ in.; jaw section, ½ in. x ½ in.; finish, blued M.S. case-hardened.

The price of the W.M.F. clamp is 15s.



Details of delivery can be obtained from the manufacturer, Winston Metal Fabrications Limited, Alpha Road, Teddington, Middlesex.

Self-Help Luggage Barrows

SELF-HELP lightweight luggage barrows, of modern design, have been built to the requirements of the North Eastern Region for the convenience of their passengers when they are unable to obtain the assistance of porters.

Although weighing only 37 lb., it is of stout construction and has a carrying capacity of 3½ cwt. It has two solid rubber-tyred wheels with ball bearings, and, being very balanced, it can easily be pushed with one hand along level railway station platforms. It is equipped with hooks for handbags, umbrellas, dog leashes, and so on.

As an experiment, 20 of the barrows have been provided at Scarborough Central Station.



The barrows have been constructed by H. B. Raylor & Co. Ltd., Thomas Street Works, Hull Road, York, which firm is prepared to build similar equipment for any railway administration.

Freight Elevator

AN elevator for bulk handling, recently installed to facilitate handling between the two levels of double-storage racking, is suitable for application, for example, to railway stores departments where a two-floor level layout is in use.

This unit is used to transfer stores trolleys between the two levels or floors of double-stage storage racking, obviating the use of the stairways.

In construction, the platform, which can be fitted either with a cage or a safety bar as required, is cantilevered out from a main frame in such a manner that the elevating mechanism is consolidated along one side of the elevator only, thus taking



Speedees Welding Electrodes

DURING recent years, the high cost of labour and the need for increased production has resulted in improved types

coating is non-conductive until fused, and consequently there is no danger of accidental flashing. Slag is easily removed and is often self-detaching, eliminating the de-slugging operation. Spatter loss is small, and thus less cleaning is required. These are contact rods and are, therefore, much easier to use.

The drag technique can be employed to advantage, reducing operator fatigue. Undercut is small and weld appearance is good, particularly when welding is carried out in the standing-fillet position. Speedees electrodes can be used on single and multiple run flat position fillets, lap welds, corner welds, prepared butt welds and cover beads. They are designed to operate with both a.c. (over 70 V.) and d.c. (preferably negative pole). The B.S. Classification is E.926 and the American Classification E.6024. They comply with the requirements of B.S. 782 and B.S. 639:1952, and are approved by the Ministry of Transport and Lloyd's Register of Shipping for the welding of mild steels.

Price and delivery details are available from the manufacturer, the English Electric Co. Ltd., Liverpool Works, East Lancashire Road, Liverpool, 10.

Ceramic Cutting Tools

A RANGE of cutting tools, using a strong ceramic insulating material as a cutting edge is now available in this country, known under the name of Sintox. The tools, which consist of only two parts, an alloy steel tool holder and a ceramic insert, appear to be suitable for many turning and facing operations in railway workshops with conventional materials; the material is stated to be ideal for



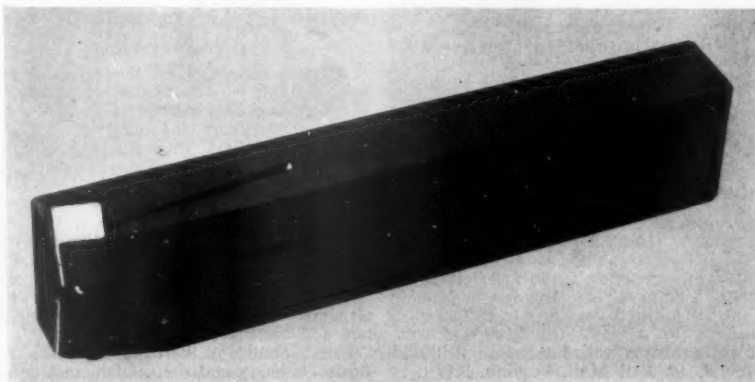
up the minimum of space on a warehouse or workshop floor.

One important advantage of this design is that the unit is entirely self-contained and requires no attachment whatever to the surrounding structure. All that is required at site is either a shallow well or else a slight ramp at the lower entry, the position of which can be on any of three sides to suit requirements.

Capacities of 10, 15, or 20 cwt. are available, and the platform size can be anything up to 72 in. by 48 in. Operation is by push button control, and power is provided by an electric motor fitted with an electro-magnetic brake driving through chain and pinions, with limit switches and electrical and mechanical interlocking gates of the hinged or sliding mid-bar type at both levels.

The price range of the standard elevator is £400-£500 according to requirements of the enquirer concerned. Further details may be obtained from the manufacturer, Barron & Shepherd Limited, 16, Blackfriars Lane, London, E.C.4.

of electrodes. Speedees electrodes have been developed which deposit more weld metal over a given time than the E.217 electrode of the same gauge. The electrode



machining cast-iron, non-ferrous metals, plastics and other highly abrasive materials.

Advantages of these tools include a resistance to cratering on all materials, absence of built-up edge, and the smooth finish obtainable. Inserts are made in three shapes, round, square and diamond for various operations, and are obtainable with a built-in chipbreaker if required.

Although primarily intended as a throw-away bit, Sintox inserts can be ground by using bakelite bonded diamond wheels. Sintox has little or no chemical affinity for most of the materials commonly machined and its surface is smooth and possessed of a low coefficient of friction. Successful applications have included both heavy rates of metal removal and very light finishing cuts at high speeds. The intense hardness of Sintox is retained even at very high temperatures. It has a relatively low thermal conductivity compared with metals, most of the heat generated by cutting being taken away in the swarf, and coolants are not generally necessary.

The ceramic material is being manufactured by Lodge Plugs Limited. The distributor is prepared to advise on the best techniques of using the new material.

The price range of the tool holders and inserts are 55s. to 73s. and 4s. to 8s. respectively. Delivery detail may be obtained from the distributor in the United Kingdom, the English Steel Tool Corporation Limited, Openshaw, Manchester.

British Railway Television Train

The first train on British Railways, equipped with sound and closed circuit television apparatus, ran recently from Glasgow to London in connection with a football match at Wembley. The train was equipped at the Cowairs Works of the Scottish Region, and consisted of 11 coaches seating approximately 500. The composition was a brake van, in which a diesel electric power unit designed to eliminate noise interference is installed; a second class brake with individual compartments, the brake portion of which is fitted up as a sound-proof studio with additional ventilation, and the individual compartments as dressing rooms for the artists; three second class open carriages each with one television set fixed above each end door; the restaurant buffet car, with loudspeakers for sound, but no television screens; four second class open carriages fitted with television sets similar to the three already mentioned; and an open second class brake fitted with a television set above the door at each end in the open carriage portion.

Points are provided in each coach to allow a roving microphone to be used when the artists visit the separate coaches as an alternative to television viewing. The coaches are wired so that they can run together as a train or separately when on normal duty. All the wiring and installation work was carried out by British Railways staff.

ACHESON COLLOIDS LIMITED BUSINESS TRANSFER.—Acheson Colloids Limited has changed its name to Acheson Industries (Europe) Limited, and has transferred its business to a new, wholly-owned subsidiary company called Acheson Colloids Limited, 18, Pall Mall, London, S.W.1.

The Brush Group Limited

Two important proposals

The 68th annual general meeting of The Brush Group Limited will be held on May 30 in London.

The following is an extract from the Statement by the Chairman, Mr. Geoffrey C. R. Eley, C.B.E., which has been circulated to stockholders.

I am sure you will wish to know a little more about the two proposals reported in the Press on April 18, and how they will affect both you and the company.

Hawker Siddeley Offer

The first proposal is the offer made by the Hawker Siddeley Group Limited to acquire the whole of the issued capital of your company. The Brush Group has been hampered for many years by a lack of permanent capital and whilst we justly appreciate the considerable assistance afforded by the Group's bankers, the shortage of permanent working capital has had a restraining effect on the development of many projects.

The proposed merger with the Hawker Siddeley Group should enable both groups to participate fully in the tremendous possibilities of the nuclear era. The advantages to be obtained from the fusion are, however, not restricted to nuclear activities. The addition of the varied range of Brush Group products with their world-wide sales markets would broaden the basic interests of the Hawker Siddeley Group, whilst the Brush Group could not fail to benefit from the technical and manufacturing knowledge available in the Hawker Siddeley Group.

Various formalities have to be completed before the formal offer is sent to Brush Group stockholders, but it will be issued as soon as possible. Your board regard the terms as fair and favourable to all parties and strongly recommend acceptance.

ASEA Electric Limited

The second proposal is the acquisition, subject to necessary formalities, of the entire share capital of ASEA Electric Limited, the name of which is to be changed to Fuller Electric Company Limited. That company is the English subsidiary of Allmänna Svenska Elektriska Aktiebolaget (ASEA) of Sweden and has a large, modern and well-equipped factory at Walthamstow where it manufactures transformers up to the largest size used in the United Kingdom, as well as other equipment.

Subject to the necessary consents, the purchase of ASEA Electric will take place irrespective of the proposed merger with the Hawker Siddeley Group.

The Year's Trading

After commenting on the financial results for the year to December 28, 1956, Mr. Geoffrey Eley continued:

Notwithstanding the difficult trading conditions of 1956 which affected most of the country's engineering industry, the Group slightly increased its turnover and received more orders than in 1955. In the important dollar market of Eastern Canada we achieved greater success than ever before in the sale of diesel engines and generating sets.

The Chairman then reviewed the Group's widespread manufacturing activities, and continued:

I am confident that the ingenuity of British industry and the fundamental good

sense and commercial instinct of the British people will keep this country among the foremost industrial nations of the world. The Brush Group has a substantial contribution to make towards that end. Our products are of high quality and our trade is sufficiently spread throughout the world to prevent our being too greatly affected by local recessions in any one area.

Antwerp-Roosendaal Electrification

Twelve special two-coach electric train sets are being built for the Netherlands Railways and the Belgian National Railways for through running between Holland and Belgium when the Antwerp-Roosendaal electrification is completed. Mechanical parts are under construction by Werkspoor (Amsterdam) and the electrical equipment by A.C.E.C. (Charleroi) and S.E.M. (Gand). Eight of the trains have been ordered by the Netherlands Railways and four by the Belgian National Railways.

The traction voltages in Holland and Belgium are 1,500 V. and 3,000 V. d.c., respectively, and the four motors in the motor coach are therefore grouped in two circuits of two 1,500 V. motors, the motors being all in parallel on the lower voltage or in two parallel pairs of two motors in series on the higher. Basically, the arrangement is a normal duplex series/parallel scheme with provision for connecting the two equipments in series for starting on 3,000 V. The line contactors will be electro-pneumatic, but notching and field-weakening will be effected by electric camshafts. Motor ratings at 1,500 V. are as follow:—

One-hour: 250 h.p., 132 A., at 1,300 r.p.m.

Continuous: 208 h.p., 111 A., at 1,400 r.p.m.

A two-coach set will measure 167 ft. 10 in. overall and will weigh approximately 120 tons empty. There will be 18 first class and 80 second class seats, with standing room for 20 and 40 passengers respectively in the two classes. Top speed will be 77.6 m.p.h. A luggage compartment, pantry, and Customs officers' compartment will be provided in each set. The first unit is expected to go into service in July this year. Provision has been made in the design for coupling to existing Netherlands Railways stock.

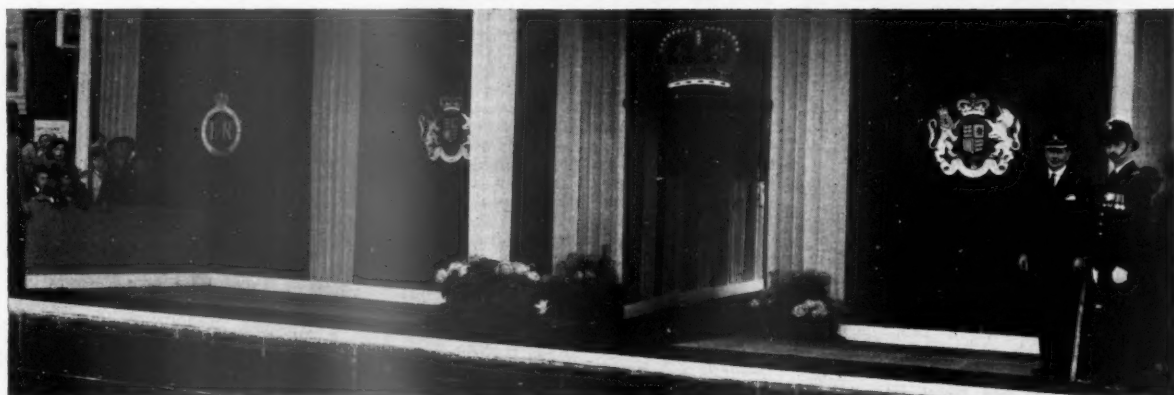
Fixed Installations

Some changes in layout have been made at stations on the line between Antwerp and Roosendaal and a few level crossings have been replaced by under- or over-bridges. After electrification the change-over from left-hand running (in Belgium) to right-hand (in Holland) will take place at Roosendaal instead of at Essen, the last station in Belgian territory, as at present.

A new substation at Ekeren will supply the line as far as the vicinity of Roosendaal. There will be a short break in contact line, extending over several yards, between the 3,000 V. and 1,500 V. systems and trains will coast through the gap with pantographs down. Locomotive-hauled trains will be hauled by Belgian locomotives to and from Roosendaal.

Royal Visit to Worcestershire and Herefordshire

The Queen leaving the Royal train at Worcester Shrub Hill for a reception at the Guild Hall, Worcester, on April 23; (left to right) Mr. W. G. Taylor, Stationmaster; Mr. K. W. C. Grand, General Manager, British Railways, Western Region; and Mr. S. G. Hearn, Chief Operating Superintendent



Ledbury Station; the decoration here, as at Hagley, Henwick, Kidderminster, Leominster, and Worcester Shrub Hill, was arranged by the Public Relations & Publicity Officer, Western Region



(Left) Decorations at Kidderminster Station; (right) the Queen escorted by Admiral Sir William Tennant, Lord Lieutenant of Worcestershire, on arrival at Hagley

Parliamentary Notes

Railway Motive Power

In a general debate on nuclear power and oil supplies in the House of Commons on April 30, Mr. John Harvey (Walthamstow E.—C.) spoke of the need for the expansion of future oil supplies and the difficulty of factories going from coal burning to oil burning and back again.

"Certainly, that is very true of British Railways," he said. When just before last Christmas, petrol rationing was imposed, people realised that they could not go away for Christmas by road. They were able to switch to British Railways and go away just the same. In a few years' time, when passenger locomotives would be diesel locomotives on long-distance journeys, it would not be so easy for motorists to go by train instead of by road.

Mr. G. Nabarro (Kidderminster—C.) pointed out that many electric locomotives would be used on main lines between London, Crewe, and Manchester.

Mr. Harvey, accepting the correction, said it was necessary to ask ourselves how far we were to go along the lines of electric locomotion rather than diesel locomotion, because electricity could be provided from coal power stations, from oil power stations, or from atomic power stations, and still the same method of propulsion could be used.

Mr. Geoffrey Wilson (Truro—C.) said the proper use of electric power would be on the railways. He and a number of other Members had just returned from an inspection of the French Railways. All the members of the delegation were very impressed with the electric lines. The French had gone into electrification in a very big way and were most efficient. At what cost was another matter, but the French railways were run under financial arrangements different from those in Britain. There was no doubt that the use of electric traction on railway lines was a very efficient and effective means of transport.

B.T.C. Finances and Salaries

The Electricity Bill, which was given a second reading in the House of Lords on April 30, will dissolve the Central Electricity Authority and create a new Generating Board responsible for generating and delivering electricity without the C.E.A.'s supervisory functions. The Generating Board and the 12 Area Boards will be made financially autonomous.

Lord Hurcomb said, in the debate, that he agreed entirely that the public bodies should be autonomous in their finance to the maximum degree.

"In my own case, if I may draw on my experience as Chairman of the B.T.C.," added Lord Hurcomb, "I think it was a very salutary thing that, when the Commission wanted money, it had to go to the market, satisfy the bank, and issue a prospectus over signatures explaining what it wanted, why it wanted it, and what its financial position was. With the Treasury guarantee, I admit that none of that had any effect upon the rate at which one borrowed, but it had a psychological effect upon oneself and upon one's colleagues, and, I am sure, was salutary. It may be an advantage to carry this principle to the 12 Area Boards of the C.E.A."

Lord Lucas of Chilworth, raising the questions of the "salary bracket" of the new Generating Board to ensure that it attracted the best brains, observed: "I suppose one of the greatest examples of tragedy provided by our nationalised

industries is that of the B.T.C. It is one of our largest industrial concerns with a turnover of £800 million a year and 800,000 employees. In the higher-bracket management groups salaries are paid that would be disgraceful in the case of the door-to-door salesman. And into that great transport industry, into which we are putting £1,200 million of the taxpayers' money, not one single entrant is going from the public schools or the universities. Indeed, this industry cannot keep the brains it has."

Viscount Kilmuir, the Lord Chancellor, replying to the debate, said the function of appointing members to the Boards was the most important single means by which the Minister and Parliament could ensure that nationalised industries were being run in the national interest. It was a basic conception of nationalisation that the Minister should appoint men in whom he had the fullest confidence, and should leave to them the day-to-day operation of the industries. If the Minister lost the right to appoint such men, the result might well be an increase in day-to-day interference with the work of the Boards of nationalised industries.

On the question of salaries, the Lord Chancellor said the first argument was the importance of getting men of first-class quality and capacity, and the second argument was that if the salaries of the chairmen were depressed it would have a depressing effect on the executives and the other people. The former Minister of Fuel & Power (Mr. Aubrey Jones) had said in the House of Commons that one of the reasons for the weakness, as the Herbert Committee said, and as the Fleck Committee said at an earlier point of time, was the great disparity in rewards at the top of a nationalised industry compared with those in the highest positions in private industry.

The financial and economic situation did not make it possible for the Government to act on this now; but the Government was giving very serious thought to this matter and recognised and appreciated the force of the comments made by both the Committees.

Questions in Parliament

Posters on Railway Stations

Mr. Ness Edwards (Caerphilly—Lab.) asked the Minister of Transport & Civil Aviation on May 1 if he would give a general direction to the B.T.C. that it should not allow the display of posters on railway stations which advertise the activities of political parties.

Mr. Airey Neave, Joint Parliamentary Secretary, said the B.T.C. did not accept politically controversial posters for display. One which was displayed on a station was merely the announcement of a dance, giving necessary information as to time and place.

Isle of Ely Crossings

Major E. A. H. Legge-Bourke (Isle of Ely—C.) asked the Minister of Transport & Civil Aviation on May 1 how many of the 4,256 level crossings, referred to in the report by his officers on level crossing protection were in the Isle of Ely; how this figure compared with the average for other English counties; and if he would give an assurance that, before deciding on altering the type of gates, he would pay due regard to the public preference for bridges.

Mr. Harold Watkinson, in a written reply: There are about 90 public road level crossings in the Isle of Ely. A com-

parison with the average for other English counties would involve a great deal of research, but on an area basis the Isle of Ely probably has more than the average. I will, of course, bear in mind the convenience of bridges, but the introduction of modern equipment should reduce delays to road traffic at many level crossings where bridges are never likely to be built.

Contracts and Tenders

British Railways, North Eastern Region, have placed the following contracts:—

Blackwood Hodge Limited, London: one Gradall multi-purpose construction machine

Rockwell Machine Tool Co. Ltd., London: one broaching machine, Shildon Wagon Works

Ebor Concretes Limited, Ripon: supply of precast concrete pit units, York Wagon Works

E. Davis (Fixers) Limited, York: fabrication of steelwork, Newcastle High Level Bridge

R. Blackett & Son Ltd., Darlington: substation and compressor house, Dinsdale.

British Railways, Southern Region, have placed the following contracts:—

C. & T. Painters Limited, London, N.W.10: renovations of roofs, Waterloo Station, and cleaning and painting Richmond river bridge

P. & M. Contractors Limited, London, S.W.1: renovations, Ramsgate Station

W. G. Beaumont & Son, London, E.3: renovations, Bognor Regis, Henfield, and Southwater Stations

Leonard Fairclough Limited, London, N.W.5: reconstruction, Brooklands Halt bridge over White Kemp sewer, and Swallow Tail bridge, Appledore

Deeds (Builders) Limited, Hounslow, Middlesex: renovations, Addlestone and Chertsey Stations

J. W. Ellingham Limited, Dartford, Kent: new staff accommodation, Nine Elms "J" shed

Durable Asphalt Co. Ltd., London, E.9: asphalt surfacing, Waterloo Station.

British Railways, Western Region, have placed the following contracts:—

Whyatt (Builders) Limited, London, S.W.16: construction of a central signal box at Acton

Davies, Middleton & Davies Limited, Cardiff: construction of a fuel storage depot and inspection pit for diesel rail cars, amenities block, and drainage at Barry Island

The Demolition & Construction Co. Ltd., Croydon, Surrey: construction of facilities for diesel working, inspection pit, drainage, amenities block and alterations to the existing carriage shed at Cardiff (Canton)

Robert M. Douglas (Contractors) Limited, Cwmbrwla, Swansea: construction of a fuel storage depot, inspection pit, drainage, staff room, fitter's shop and oil store at Treherbert

Automatic Telephone & Electric Co. Ltd., London, W.C.2: provision and installation of a telephone exchange at Banbury Station

Dowding & Mills Limited, Bordesley, Birmingham 12: supply, installation, testing, connecting and setting to work of electric lighting facilities, goods station, Netherton

Pirelli General Cable Works, Limited,

Southampton: supply, installation, testing, connecting and setting to work of electric lighting facilities, at Oxley sidings, Wolverhampton, and at station and yard, Trowbridge.

Bective Electrical Co. Ltd., London, W.C.2: supply, installation, testing, connecting and setting to work of electric lighting facilities at station and yard, Westbury, Wilts, and Chippenham, and at Avonmouth Dock Station.

Prince of Wales Dry Dock Co. (Swansea) Ltd., Swansea: work to be performed in connection with the annual overhaul of the ss. *Great Western*.

The Special Register Information Service, Export Services Branch, Board of Trade, reports that the closing date for the call for cast-steel frame passenger-car type bogies for Australia, which appeared on page 405 of our issue of April 5, has been extended to May 23, 1957.

The Special Register Information Service, Export Services Branch, Board of Trade, states that the closing date of the call from Australia for railcar bodies and underfloor equipment, reported on page 320 of our issue of March 15, has again been extended and is now May 23, 1957.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Sudan for three wagon underframes. The issuing authority is the Controller of Stores, Sudan Railways, Atbara. The contract No. is 1595. The closing date is May 28, 1957. Specifications together with drawings giving full particulars of the underframes can be obtained from the office of Controller of Stores, Atbara, on application. No further information is available at the Board of Trade about this call for tenders. The reference ESB/11091/57 should be quoted in any correspondence with the Branch (Lacon House, Theobalds Road, W.C.1).

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from Sudan for tank wagons as follows:—

- 20 benzine tank wagons
- 20 fuel oil tank wagons

The issuing authority is the Controller of Stores, Sudan Railways, Atbara. The contract No. is 1600. The closing date is May 30, 1957. Specifications, together with drawings giving full details of these tank wagons, can be obtained from the office of the Controller of Stores, Atbara, on application. No further information is available at the Board of Trade about this call for tenders. The reference ESB/11096/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, reports a call from India for 208 signal brackets, channel type, two doll, with signal fittings type "A," complete with ladder.

The issuing authority is the Director General of Supplies & Disposals, and the tender number is SRIA/24017-H/V(C). Bids should be sent to the Director General of Supplies & Disposals, Shahjahan Road, New Delhi. The closing date is May 21, 1957.

A set of tender documents is available for loan to United Kingdom firms from the Branch (Lacon House, Theobalds Road, W.C.1) in order of receipt of applications. A photo-copy set can be pur-

chased from the Branch for 16s. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. To avoid delay, firms wishing to collect photo-copy sets of tender documents are advised to notify their requirements in advance. The reference ESB/10773/57 should be quoted in any correspondence with the Branch.

The Special Register Information Service, Export Services Branch, Board of Trade, has received a call from India for steel rails as follows:—

- 51,770 tons 90 lb. R.B.S. basic open-hearth medium manganese steel rails in 42 ft. lengths with 10 per cent short down to 27 ft. rising by 3 ft.

The procurement authorisation No. is 86-660-99-A8-6207. The issuing authority and address to which bids should be sent is the Government of India, Ministry of Heavy Industries, Iron and Steel Control, 33, Netaji Subhas Road, Calcutta 1. This purchase will be financed by the International Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to under-developed countries. The closing date is May 24, 1957. Copies of specifications and other documents relating to calls for tender under I.C.A. aid can generally be obtained from the India Store Department, Government Building, Bromyard Avenue, Acton, London, W.3. A copy of the specifications and conditions applying to this particular call for tenders may be inspected in Room 728 at the Branch (Lacon House, Theobalds Road, W.C.1). An additional copy is available for loan on application. Photo-copy sets of the documents can be obtained at a cost of 18s. from the Branch. Cheques and postal orders should be made payable to the Principal Accountant, Board of Trade. Firms wishing to collect photo-copy sets of tender documents are advised to notify the Branch in advance of their requirements. The reference ESB/11051/57/ICA should be quoted in any correspondence with the Branch.

Staff and Labour Matters

Railway Workshop Staff Pay Settlement

A settlement of the claim for an increase in the pay of railway workshop staff was reached at a meeting in London on May 1 between the B.T.C. and the employees' side of the Railway Shopmen's National Council. This settlement is for an increase of 5 per cent in shopmen's rates of pay, the claim of the employees' side having been for an increase of 10 per cent. Some 120,000 staff are affected, rates in general being raised by 7s.—8s. 6d. a week. The settlement operates from January 7, 1957.

At the meeting on May 1 the B.T.C. representatives stated they were prepared to offer a 5 per cent increase in rates of pay for railway shopmen, on the understanding that the trade unions subscribed to certain proposals. The representatives of the employees' side stated that the Confederation of Shipbuilding & Engineering Unions on principle was not prepared to accept a settlement on a wage claim to which were attached certain declarations. On the other hand its representatives saw nothing to which they could object in the proposals made by the Commission. They had already pledged themselves to full co-operation towards increasing productivity, and would continue in their efforts to

do so. With regard to the B.T.C. proposal for periodical reviews at agreed intervals of time, they appreciated the position of the B.T.C. and would be prepared to give formal and serious consideration to this proposal. The National Union of Railwaymen was prepared to subscribe broadly to the proposals.

In the light of these understandings the Commission stated it would be prepared to effect a settlement on the rates of pay of railway workshop staff as set out above.

The conditions referred to were set out in a proposed joint declaration, the text of which was given in our issue of April 19.

Notes and News

New Booking Office for Broad Street Station.—Work has begun on a new booking office, stationmaster's, and other offices, at Broad Street Station, London Midland Region. Recently the station received extensive roof repairs and a new awning outside. An improved enquiry office has been built and electric lighting and a modern train indicator installed.

Keith Blackman Limited at the B.I.F.—Among exhibits being displayed by Keith Blackman Limited at this year's British Industries Fair, most of which are operating, is a Mk. II Keno wet washer, for removing finely divided dust or other contaminants from an air stream; and solid P.V.C. fume removal fans, for exhausting highly corrosive fumes. The B.I.F. is currently being held at Castle Bromwich until May 17.

B.I.C.C. Limited Mineral-Insulated Cables.—The process of manufacture of mineral-insulated cables by British Insulated Callenders Cables Limited was demonstrated to a special Press party on May 6, at the company's factory at Prescott, Lancashire. The Cable Manufacturers' Association recently instigated an intensive research and development programme, which has resulted in erection of a plant devoted exclusively to the manufacture of M.I. cables. The new techniques developed result in the production of cable of uniformly high quality, strictly within tolerances, completely annealed, and complying in all respects with B.S. requirements.

Parliamentary Secretary Visits Installations at Toton and Derby.—Mr. G. R. H. Nugent, Parliamentary Secretary to the Ministry of Transport & Civil Aviation, recently visited Toton Marshalling Yards, Derby St. Marys Goods Depot, the Derby Carriage & Wagon Works, and the Locomotive Works. In the course of visits to railway installations in the various Regions, he went to Willesden in March to see the marshalling yard, carriage cleaning depot, and motive power sheds there. On his visit to Derby, he was accompanied by Mr. L. W. Cox, Chief Operating Superintendent, London Midland Region, and by Mr. W. B. Carter, District Commercial Manager, to St. Marys Goods Depot. Mr. H. Randle, Carriage & Wagon Engineer, and Mr. T. F. B. Simpson, Locomotive Works Manager, were with Mr. Nugent on his visits to their respective works.

Institution of Locomotive Engineers Revises Constitution.—A special general meeting of the corporate members of the Institution of Locomotive Engineers was held at the offices of the Federation of

British Industries on March 27, 1957, when the Council's proposed revision of the Memorandum of Association, Articles of Association, and By-Laws of the Institution were duly approved.

Railway Club New Premises.—The Railway Club is removing from 57, Fetter Lane to 320, High Holborn, London, W.C.1. The new premises are on the south side of High Holborn, close to Chancery Lane Station, and will be open to members for the first time on May 31, when Mr. R. E. Vincent will read his paper on "Some Practical Aspects of Railway Colour Photography" at 7 p.m.

Re-numbering of British Railways Diesel Locomotives.—A new system of numbering for all main-line diesel locomotives and for new and existing standard diesel shunting locomotives is to be adopted by British Railways. The basis of the scheme is the use of a prefix letter "D" followed by the locomotive number. The only exceptions to this scheme will be the existing eight main-line diesel and gas-turbine locomotives, which will retain their present numbers.

Improved Refreshment Facilities at Crewe Station.—Greatly improved refreshment facilities are now available at Crewe Station. The former refreshment room and dining room between platforms 3 and 4 has become a single modern room 100 ft. long containing a combined self-service cafeteria, a tea and sandwich bar, a licensed bar and waiting room. The room, shown in the accompanying illustration, is brightly illuminated and the walls are panelled in framed colours of pale blue, yellow, imperial red and black, and the settees round the walls are of grey and black patterned plastic, upholstered with Dunlopillo cushioning. The floor is in black terrazzo, inset with white and blue sections in a random pattern. The ceiling, which has been reduced in height by 5 ft. from the original, is painted mid-night blue. The furniture generally is natural beech, approximately half of the chairs being upholstered in red Vynide

and the other half in grey. The modernisation has been planned and produced by British Transport Hotels & Catering Services, and the general contractor was A. Edmonds & Co. Ltd., London, E.C.1.

Princess Margaret's Voyage in British Railways Clyde Steamer.—The Lord Provost of Glasgow, by whom Mr. G. W. Stewart, Assistant General Manager, British Railways, Scottish Region, was presented to Princess Margaret on the occasion of her recent visit to Glasgow and sail in a vessel of the Caledonian Steam Packet Co. Ltd., is Mr. Andrew Hood, J.P., and not Sir John Banks, as stated in error in our May 3 issue.

Professional Engineers' Appointments Bureau.—The report for 1956 of the Professional Engineers' Appointments Bureau, of 9 Victoria Street, London, S.W.1, shows the unabated demand for technological manpower. During the year an increasing number of Canadian and American firms availed themselves of the Bureau's service. It is not, however, the policy of these firms to recruit engineers from this country whose experience can be described as general and an appointment is unlikely to result where the experience of a candidate is not in some specialised field of engineering. The complex national situation at home, the report states, has tended to encourage emigration. So long as the supply of engineers remains below the level necessary to meet the increasing demands to fill outstanding vacancies at home, no opportunity should be lost to emphasise the great importance of increasing training in this country, to a point where the supply of young engineers can keep pace with the expansion of engineering at home and overseas. Despite a decrease in the number of engineers registering with the Bureau, those placed in 1956 increased. The number of vacancies notified did not fluctuate appreciably, but a larger proportion was for senior administrative posts, which now attract a reasonable selection of qualified applicants. The average salaries of successful placings were higher than for pre-

vious years, and it is reported to be harder now to find sufficient candidates from those registered who are seeking salaries much below £800 a year. Employers and engineers have found the Bureau particularly useful in obtaining information on the current position of employment.

Diesel Engineers & Users Association Luncheon.—Mr. K. H. Tuson, President of the Diesel Engineers & Users Association, presided at a luncheon held in the Connaught Rooms, London, W.C.2, on May 2. In reviewing the Association's activities during last year, he proposed a vote of thanks to members who read papers during the winter and announced the award of a medal for the best paper to Mr. J. S. Tritton, on "The Special Requirements of Diesel Engines for Rail Traction." Mr. J. H. Pitchford, Managing Director of Ricardo & Co. Ltd., replied to the toast of the guests.

East Africa Loan Oversubscribed.—The East Africa £11,500,000 loan, to which editorial reference was made in our issue of May 3, was oversubscribed. Applicants for the £7,000,000 railways and harbours stock received allotment for amounts up to and including £500, in full; for £600-£1,000, £500; larger amounts, some 30 per cent of the amount applied for. The £2,500,000 post and telecommunications loan was allotted as follows; applicants for amounts up to and including £300 receive £100; for £400 to £600, £200; £700-£1,000, £300; larger amounts, 30 per cent. Of the 5½ per cent stock, £2,000,000 had already been taken up on behalf of Colonial Government Funds.

Posthumous Award of George Cross to Engine Driver.—The driver of a train involved in an accident at Chapel-en-le-Frith on February 10. Mr. John Axon, has been awarded the George Cross posthumously for his action in remaining on the footplate of a runaway train in an endeavour to prevent the accident. The citation for the award states: "Mr. Axon was in charge of a train of over 500 tons of freight which was running at 15 m.p.h. on the London Midland Region line from Buxton towards Chapel-en-le-Frith. He was preparing to stop the train before descending a steep gradient when with a deafening noise, the steam pipe feeding the brake suddenly fractured. This not only destroyed the braking system but filled the driving cab with blinding, scalding steam which was discharged at a very high pressure directly at the feet of Axon, who was badly burned. He could have abandoned his engine and saved his life but, realising the danger of a runaway, he remained at his post and, with great bravery and determination, endeavoured to get the train under control. . . ." He was killed in the subsequent accident. On hearing the news that Driver Axon had been awarded the George Cross, Mr. David Blee, General Manager, London Midland Region, said he was very proud that so heroic an action had been recognised by the Queen in so signal a manner.

New Liverpool Office for B.T.C. Commercial Advertising Service.—The British Transport Commission Commercial Advertising Service has recently opened a new office in Liverpool, which will provide a closer contact and improved service for advertisers in the City of Liverpool and in the Wirral. The new office forms a branch of the Area Sales Office at Manchester, and will enable the Commercial Advertising Service to keep in closer touch with the requirements of advertisers who



Reconstructed refreshment room at Crewe Station

will be able to arrange locally for the hire of advertising sites on a local or nationwide basis. The Commercial Advertising Service representative at the Liverpool office is Mr. S. Broadbent and the address is: Commercial Advertising Service, British Transport Commission, Spinney House, Church Street, Liverpool, 1. Telephone Royal 8542.

Council of Europe Channel Tunnel Decision.—The Consultative Assembly of the Council of Europe, on which 15 countries are represented, decided on May 4 to study a plan for building a Channel tunnel. The Economic Committee was instructed to make a detailed plan of the project.

Dorada Railway Bid.—The Dorada Railway Co. Ltd. has been approached concerning a possible bid for its capital stock and formal proposals are expected shortly. The board estimates that the amount which would be payable to holders in a liquidation after allowing for expenses would be in the region of £58-£59 per £100 stock.

New Engines for Windermere Steamer.—The steamer *Swift* on Lake Windermere is being fitted with two 120-h.p. Gleniffer diesel engines to replace the present steam machinery. The vessel was built in 1900 and accommodates 780 passengers. The old engine was a four-cylinder compound worked by steam from a locomotive boiler. The four British Railways steamers on Lake Windermere operate between Lakeside, Bowness, and Ambleside during the summer.

New Staff Building at Horwich Works.—New shower baths, washing facilities, lockers, cloakrooms and lavatories are to be installed for foundry staff at Horwich Locomotive Works, under a £46,500 scheme recently begun by British Railways, London Midland Region. The new facilities will be housed in two new amenities buildings. There will be an entirely new building for the staff of the general foundry, and an additional floor will be built on to the present amenities block for use of staff of the mechanised foundry.

Cheap Mid-week Travel.—Cheap mid-week return tickets were re-introduced by British Railways on May 7 to encourage travel in the middle of the week instead of at weekends. These tickets, which offer a saving of 4s. in the £ on the second class fare, are issued for travel on Tuesdays, Wednesdays, and Thursdays, between any pair of stations in Britain 100 miles or more apart. They are available for return on the Tuesday, Wednesday, or Thursday of the following week or the week after. A new feature this year is a corresponding cut of 4s. in the £ in the charges for dogs, bicycles, and perambulators accompanying passengers holding mid-week return tickets. These facilities are available until October 31.

Scottish Region Ambulance Competition.—Edinburgh Waverley team, with 258½ points, won the Scottish Railways Shield in the Scottish Region Men's Final which was held on May 2 at the St. Andrew's Ambulance Association Headquarters, Glasgow. The total number of teams taking part in the preliminary stages of the competition held in various districts of Scotland was 55, of which 13 qualified for the final. The Edinburgh Waverley and Motherwell No. 1 (252 points) teams will represent the Scottish Region at the

British Railways Inter-Regional Competition to be held in London on June 5 and the first four teams (the two named, and Perth "A" and Falkirk "A"), with the Falkirk (Women's) team, will take part in the International Competition in Glasgow in October.

Churchill Machine Tool Co. Ltd. Results.—The ordinary dividend of the Churchill Machine Tool Co. Ltd., for 1956 is maintained at 30 per cent, with a final payment of 20 per cent (against 15 per cent and a jubilee bonus of 5 per cent). The net profits were £345,446 against £349,225 for 1955, after all charges including tax of £410,500 (£421,000).

Derbyshire Carriage & Wagon Co. Ltd.—The dividend of the Derbyshire Carriage & Wagon Co. Ltd. is maintained at 11 per cent as for last year. Group trading profits for 1956 rose to £74,328 from £64,704 for 1955. Net profits, after tax of £31,887 (£26,445), were virtually unchanged at £26,980 (against £26,912). The annual general meeting will be held on May 2.

Charles Roberts & Co. Ltd.—The directors of Charles Roberts & Co. Ltd., carriage and wagon builders and financiers, have declared an interim ordinary dividend of 4½d. per 5s. stock unit, less tax, and propose a distribution of 1½d. per unit, not subject to tax, from realised capital accretions. For the previous year, to March 31, 1956, payments comprised a less-tax interim of 4½d. plus a special centenary distribution of 1s. per unit, not subject to tax, out of capital surplus, and a final of 4½d. less tax, plus 1½d. not subject to tax, from capital accretions.

New Roof Awnings at Doncaster.—Modern awning type roofs are to be built over platforms Nos. 4, 5, and 6 and cold cathode electric lighting installed at Doncaster Station, Eastern Region. The new platform roofs will be built of glass and asbestos cement decking upon steel frame-

ing, supported by steel stanchions and cross members. When the roofing has been completed, cold cathode lighting already installed in other parts of the station, will be fitted in place of the temporary lighting. The new awnings were designed and will be erected under the general direction of Mr. A. K. Terris, Chief Civil Engineer, Eastern Region. The general contractor for the reconstruction work is Wm. Proctor & Sons Limited, of Sheffield and the contractor for the steelwork the California Engineering Co. Ltd., of Bury.

Head Wrightson Teesdale Limited.—The Engineering Division of Head Wrightson & Co. Ltd. has become a wholly-owned subsidiary company with the title of Head Wrightson Teesdale Limited. This company is carrying on the business of the Engineering Division with no change of personnel, and all correspondence should be addressed to Head Wrightson Teesdale Limited, Thornaby-on-Tees.

Cattle by Rail.—The British Transport Commission on May 1 issued a statement in regard to the Report of the Committee of Enquiry into the Export of Live Cattle to the Continent for Slaughter. The Commission welcomes the Committee's appreciative reference in paragraph 29 of the report to the "efforts of British Railways to ensure considerate handling of the livestock committed to their care," and states that immediate consideration is being given to the various recommendations in the report affecting British Railways, especially those in regard to bruising of cattle in transit and the design of railway wagons for cattle traffic. As to the Committee's recommendation that "to the maximum possible extent" cattle "should be carried in trains fitted with continuous brakes," the Commission states that under the railway modernisation plan all new cattle wagons will be equipped with this type of brake, and that more than 8,600 of the present stock of 11,000 cattle wagons already is so fitted.

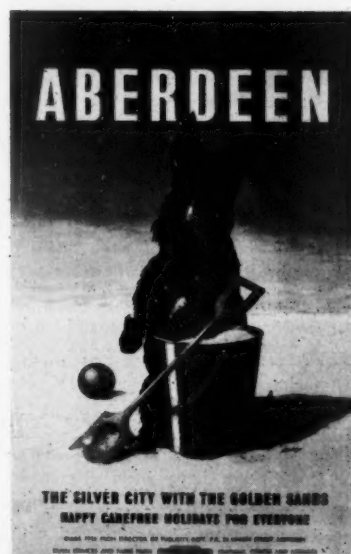
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Railway Stock Market

Active and buoyant conditions have featured stock markets, where the volume of business was almost at its highest for two years and was well spread in nearly all sections. Biggest stimulus was the continued expectation of an early cut in the bank rate to 4½ per cent, but better reports from some leading industries about export trade also helped sentiment. It is realised that generally profits are not increasing this year because of rising costs and increased competition, but the assumption is that the outlook is brightened by the success expected to be achieved by bigger efforts in export markets.

Foreign rails provided a number of gains, the biggest being a jump of 9 points to 60 in Dorada ordinary stock following the directors' statement that a possible bid may be made for the stock. Meanwhile further news is awaited, and the price has eased a point to 59. If a bid develops it will provide an illustration of the wisdom of stockholders in a company which plans liquidation holding on and awaiting developments.

There was good demand for Antofagasta stocks on hopeful views as to the benefits the company may derive from the Budget concession in respect of overseas businesses. The ordinary stock, with a rise on balance from 30½ a week ago to 35½, touched the highest point this year, while the preference stock has been marked up from 45½ to 47½.

United of Havana income stock strengthened fractionally to 8½, and elsewhere, Chilean Northern 5 per cent debentures have changed hands around 44. Mexican Central "A" bearer debentures were 70½, and in other directions, San Paulo Railway 3s. ordinary units kept at 3s. 4½d. Business around 11s. 4½d. was recorded in Taltal Railway shares.

Canadian Pacific showed activity, and with a rise on the week from \$67 to \$68½ touched a new high record for the year, while the 4 per cent preference stock strengthened to £58½, but the 4 per cent debentures eased slightly to £70½. White Pass shares responded to the higher quarterly earnings and moved up from \$23½ to \$25½, the best level recorded this year.

The shares of locomotive builders and engineers reflected the upward trend in markets. Beyer, Peacock were higher at 44s. 4d helped by the chairman's annual statement and the proposal to deal in the shares in 5s. units. North British Locomotive improved further from 16s. 9d. to 17s. 9d., but Charles Roberts 5s. shares at 11s. and Birmingham Wagon at 18s. have eased slightly. Gloucester Wagon 10s. shares held firm at 13s. 6d. and Wagon Repairs 5s. shares were firmer at 14s. 3d. Westinghouse Brake gained 1s. at 41s. Allowing for the fact that they are now "ex" rights to the new shares, English Electric at 60s. were 2s. higher on balance. The new shares were at a premium of 11s. 9d. over this issue price. General Electric strengthened from 58s. 3d. to 59s. and Associated Electrical from 67s. 6d. to 68s. 9d.

There was again good demand for T. W. Ward which advanced further from 79s. 6d. to the new record level of 82s. 9d. Vickers have been firmer in front of the full results, while in response to the higher dividend of 13½ per cent, Guest Keen rose to 57s., compared with 50s. 9d. a week ago.

The 4s. shares of the Channel Tunnel Company, which were only 2s. 6d. earlier in the year, and were over 12s. recently

before they reacted, lost 9d. to 9s. 3d. after the annual meeting of the company on Monday. It was confirmed that the Suez Canal Company wishes to investigate the possibilities of a Channel tunnel, but the final decision on whether there is to be a tunnel and how it is to be financed and controlled will, of course, rest with the British and French Governments. British Railways are the largest shareholders in the Channel Tunnel Company.

Steel shares eased earlier this week following Mr. Bevan's statement that a future Labour Government would re-nationalise steel.

Forthcoming Meetings

Open currently and until further notice.—

British Transport Commission: Historical Exhibition "Transport Treasures" in Shareholders' Meeting Room, Euston Station, from 10 a.m. to 6 p.m. on weekdays, and 2 to 6 p.m. on Sundays. Admission 6d.

May 15 (Wed.).—Permanent Way Institution, Manchester & Liverpool Section. Second visit to Mersey Tunnel installations. Members meet at Georges Dock Building, Pier Head, Liverpool, at 7.30 p.m.

May 16 (Thu.).—Model Railway Club, at Caxton Hall, Westminster, S.W.1, at 7.30 p.m. Annual General Meeting.

May 16 (Thu.).—Railway Correspondence & Travel Society, West Riding Branch, at the British Railways Social & Recreation Club, Aire Street, Leeds, 1, at 7.30 p.m. Paper by Dr. P. Ransome-Wallis on "Recent experiences on Danish Railways," illustrated by lantern slides.

May 17 (Fri.).—Institution of Mechanical Engineers, at 1, Birdcage Walk, Westminster, S.W.1, at 6 p.m. Paper on "Diesel engine lubricants—their selection and utilisation with particular reference to oil alkalinity," by Messrs. A. Dyson, L. J. Richards, and K. R. Williams.

May 19 (Sun.).—Stephenson Locomotive Society. Special train tour to Margate, leaving Victoria Station at 11.58 a.m.

May 20 (Mon.) to May 23 (Thu.).—Institution of Locomotive Engineers. Summer Meeting at Buxton.

May 21 (Tue.).—Railway Correspondence & Travel Society, East Midlands Branch, at the U.C.S. Guild Room, Toll Street, Nottingham, at 7.30 p.m. "The history of Colwick Motive Power Depot," by Messrs. S. Checkley and C. A. Hill.

May 22 (Wed.). to May 27 (Mon.).—Institution of Railway Signal Engineers. Summer Convention in Switzerland, led by the President, Mr. A. W. Woodbridge.

May 25 (Sat.).—Permanent Way Institution, Leeds and Bradford Section. Morning visit to Bredbury Steelworks and Rolling Mills, Woodley, nr. Stockport, Cheshire.

May 25 (Sat.).—Railway Students' Association. Visit to the Cromford & High Peak Railway. Party leave St. Pancras at 8.15 a.m.

May 29 (Wed.).—Railway Students' Association, at the London School of Economics, at 6.15 p.m. Annual General Meeting.

May 31 (Fri.).—The Railway Club, at 320, High Holborn, London, W.C.1, at 7 p.m. Paper on "Some railway aspects of railway colour photography," by Mr. R. E. Vincent.

OFFICIAL NOTICES

PRODUCTION ENGINEER required to take charge of manufacture of railway and lorry springs. Reply, stating age, salary and previous experience, Box 344, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

SENIOR LOCOMOTIVE DESIGNER with 100-500 B.H.P. Diesel shunter experience required by old-established Yorkshire Company manufacturing Diesel mechanical Locomotives and other products. Experience in transmission design an advantage. Contributory Pension Scheme and free Life Assurance Scheme operating.—State fullest particulars, experience, technical qualifications and salary required, to Box 338, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

LONDON TRANSPORT requires the following staff for permanent way work:—(a) **EXECUTIVE ASSISTANT** for estimating, preparation and supervision of schemes and detailed working drawings for new permanent way works. Comprehensive experience in all branches of permanent way work and preferably A.M.I.C.E. Salary range, £940-£1,100. (b) **ENGINEERING ASSISTANT CLASS 1** for preparation of detailed working drawings of permanent way junction work design, setting out and surveys as required for new works. Knowledge of permanent way work in tunnels and Ordinary National Certificate, studying for Higher National Certificate. Salary range, £915-£950. Free travel; medical examination.—Applications within 14 days to Recruitment and Training Officer (F/EV 632 a or b), London Transport, 55, Broadway, S.W.1.

REQUIRED for BRITISH RAILWAYS: DESIGNER DRAUGHTSMEN for Carriage and Wagon Engineering Development Unit located at Darlington. Applicants should have a good general education and technical qualifications to Higher National Certificate in mechanical engineering. Applicants must have served an apprenticeship in a Railway or Contractor's works, preferably engaged on carriage and wagon construction, and should have an intimate knowledge of carriage and wagon design. Should be capable of carrying out the necessary calculations and design work in connection with new development. Five-day week and travelling concessions. Salary range, £916 per annum rising to £956 after two years.—Application in writing, giving details of age, education, training, qualifications and experience, to Carriage and Wagon Engineer, British Railways, Eastern and North Eastern Regions, Doncaster.

BRITISH TRANSPORT COMMISSION.—ELECTRIC TRACTION ENGINEER (Research) required in the office of the Commission's Chief Electrical Engineer (British Railways Division). Knowledge of all aspects of railway electrification and the ability to envisage the potentialities of the A.C. system and improvements of the D.C. system; experience in other fields of engineering; Honours Degree in engineering and good working knowledge of scientific matters. Responsible for general direction of research effort in railway electrification and co-ordination of research between Universities, manufacturers and within the activities of British Railways. Commencing salary up to £2,500 p.a. according to qualifications. Further advances dependent on degree of development of work. Superannuation scheme. Certain free travel facilities. Medical examination.—Write, stating age, qualifications and experience to Manpower Adviser, British Transport Commission, 222, Marylebone Road, N.W.1, within 14 days. (Ref.: Nom. 207.)

20 LOCOMOTIVES, coal burning, metre gauge, of same type, in good condition, with repair parts, on sale at Djibouti.—Write to: Compagnie du Chemin de Fer Franco-Ethiopien, 21 Bis, rue Lord Byron, PARIS VIII^e, France.

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